Ontario Hydro's Board of Directors' Report for 1987

To:
The Honourable Robert Wong
Minister of Energy

Ontario Hydro's Board of Directors submits to you this report of the financial position and relevant Ontario Hydro activities for the year 1987.

We thank you and Ministry of Energy staff for the cooperation extended during the year.

On behalf of the Board,

R G Franklin

Robert Franklin
Chairman and President
April, 1988

THE CORPORATION

89-00252/

Ontario Hydro's prime objective is to supply the people of Ontario with electricity at cost while maintaining high standards of safety and service. To that end, it operates 80 hydraulic, fossil and nuclear generating stations and an extensive power grid across Ontario to meet the province's demands for electric energy.

Ontario Hydro is a financially self sustaining corporation without share capital created in 1906 by a special statute of the Province of Ontario. Bonds and notes issued to the public by the Corporation are guaranteed by the province.

Under the authority of the Power Corporation Act, Ontario Hydro has broad powers to generate, supply and deliver electricity throughout the province. It is also authorized to produce and sell steam and hot water as primary products. In addition, Ontario Hydro exercises specific regulatory functions over municipal utilities as well as the approval and inspection functions for electrical equipment (in conjunction with the Canadian Standards Association) and electrical wiring installations throughout the province.

Ontario Hydro sells wholesale electric power to municipal utilities in urban areas which, in turn, retail to customers in their service areas. Ontario Hydro also serves directly more than 100 large industrial customers and 835,925 rural retail customers in areas or communities not served by municipal utilities. In 1987, approximately 3,344,000 customers were served by Ontario Hydro and the municipal utilities in the province.

The business and affairs of Ontario Hydro are directed and controlled by a board of directors made up of a chairman, vice-chairman, a president, and not more than 10 other directors. All members of the Board, who represent a broad spectrum of Ontario society, are appointed by the Lieutenant Governor in Council of the province except the president who is a full-time employee of the Corporation appointed by the Board.

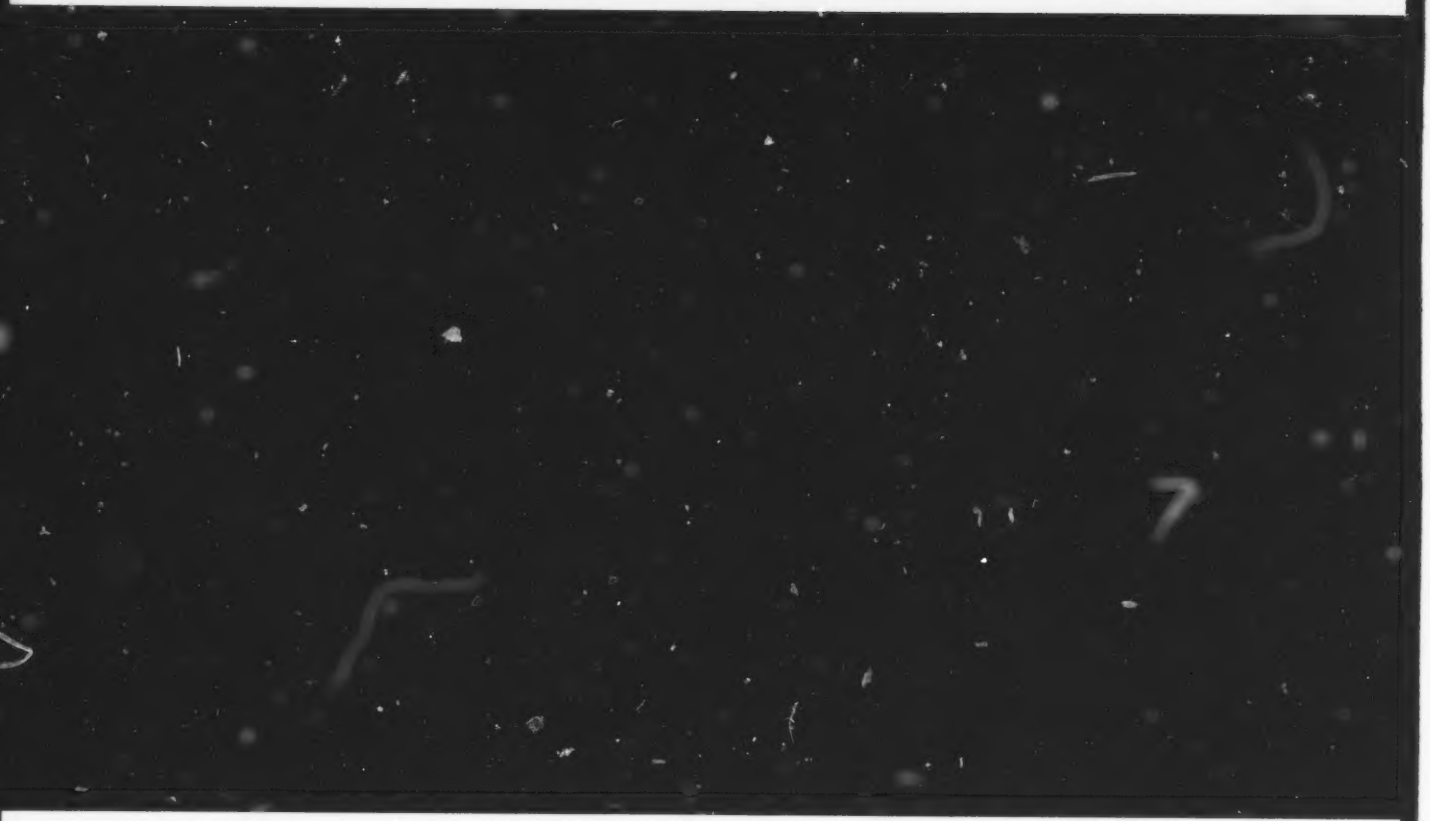
To assist the Board in directing the Corporation's affairs there are five Committees of the Board: Finance, Audit, Management Resources, Social Responsibility, and Technical Advisory. In 1987, a new committee was formed to advise the Ontario Hydro Board members about northern affairs. Six individuals from northern Ontario, none of whom are members of the Board, were appointed by the provincial government to the Northern Ontario Hydro Advisory Committee. All the committees review and make recommendations to the Board on matters within their terms of reference.

Ontario Hydro's head office is located at 700 University Avenue, Toronto, Ontario. For administrative and operational purposes, six regional and 47 area offices are maintained throughout the province.

FINANCIAL HIGHLIGHTS

	1987	1986
	millions of dollars	
Revenues	5,280	4,853
Net Income	271	247
Total Assets	32,657	31,357
Investment in Fixed Assets	2,524	2,523

SECURING TOMORROW TODAY
ONTARIO HYDRO AND THE ENVIRONMENT



Our society's concern for the environment is an explicit recognition that what we do today has a direct effect on tomorrow. It is a concern shared by all the people of Ontario, for we all benefit from the natural wealth of our province and the bright future it promises.

Almost anything humans do affects the natural environment to some degree. But that must be balanced against the contributions technology makes to our lives. As well, if technology is a source of environmental problems, technology – and the human expertise which develops it – may also be our best source of solutions.

By the very nature of our business, Ontario Hydro affects the environment, both natural and social. The effects vary, depending on the size and type of operation. But the fact remains, we create environmental problems.

At the same time, Ontario Hydro provides a product that has come to be an essential element of our lives. Our broad objective as a corporation, then, must be to obtain the maximum benefit from our technology with the minimum impact on the natural world.

Because we operate in virtually every corner of the province, we address a broad range of environmental issues, from the handling of PCBs to the flooding of land as a result of hydraulic projects. At Ontario Hydro, therefore, responsibility for mitigating environmental effects cuts across almost every area of the organization. Highly skilled specialists – biologists, chemists, physicists and engineers – work full-time to identify potential environmental hazards and to find solutions or methods of control.

The problems these specialists address include everything from concern for nesting birds to design contingencies in nuclear reactors. But large or small, the problem commands the same high degree of commitment.

Two major issues cause most public concern: the safety of nuclear operations and acid gas emissions from fossil-fuel stations. But many other environmental concerns also stake a claim to our attention. Our objective in each case is to use each dollar wisely to find the best solutions. Thus, Ontario Hydro initiatives, from the day the concepts are proposed, must pass tests for environmental and social acceptability, safety, reliability and economic soundness.

In nuclear operations, for instance, Ontario Hydro is among the world leaders in generation performance and safety. In more than 20 years, radioactive emissions have never exceeded Atomic Energy Control Board limits. No member of the public has ever been harmed. This record is a result of the built-in design features of Ontario Hydro's CANDU reactors, an exacting nuclear operator training program, and rigorously tested and monitored transportation and storage facilities.

We continue to work closely with Atomic Energy of Canada Limited (AECL) to find a preferred method of nuclear waste disposal. In 1987, for example, we committed about $25 million to fund the AECL research program, much of which is focussed on the disposal issue. That financial support was almost three times the level committed in 1986 and, in 1988, we expect the funding to be about $35 million.

This work is continuing even though the current short-term method of storing used fuel bundles in water-filled pools at each nuclear station has proven safe, reliable and able to meet the needs well into the next century.

In other areas of electricity production, some of our technology is older than recent understanding of the problem. Knowledge of the impact of acid rain, for example, has grown rapidly over the last dozen years. Yet Lakeview Thermal Generating Station was designed in the 1950s and our other coal-fired stations in the 1960s.

This has left Ontario Hydro with some catching up to do, and we have initiated corrective action. Since 1982, Ontario Hydro has reduced its acid gas emissions by 25.8 per cent. At the same time, it has met a power demand that has increased by 20.3 per cent and held rate increases to some of the lowest levels in years.

This has not been easy. In 1987, Ontario Hydro burned 49 per cent more coal than forecast, largely because dry weather reduced the amount of water available for hydraulic generation. As a result, our emissions, although still below regulated limits, were 25 per cent higher than in 1986.

There are a number of programs we have initiated to find the best long-term solutions. Modifying burners, washing and blending coal, and burning low-sulphur western Canadian coal all help reduce emissions. We continue to conduct research aimed at minimizing acid gas emissions at the combustion stage. In the next three years, Ontario Hydro has earmarked $7.7 million for those efforts which focus on four types of flue-gas desulphurization to reduce sulphur dioxide emissions. Testing on one process, in which limestone is injected directly into the steam generator's furnaces, is continuing at Lakeview Generating Station.

Another promising environmental effort is Ontario Hydro's promotion of energy efficiency and load shifting. Successful programs in these areas can reduce the need for new supply, minimizing the adverse effects of electricity generation on the environment.

With energy efficiency programs and financial incentives, Ontario Hydro expects to be able to slow significantly the growth in demand by the year 2000.

As well, for certain applications, electricity is cleaner and more efficient than oil and gas. In those instances, it makes environmental and economic sense to promote the substitution of electricity.

Careful management of the impact of any industry on the environment requires a multifaceted approach that begins with corporate commitment. Ontario Hydro has assigned hundreds of people and millions of dollars to minimize its impact on the environment even as the Corporation has met the province's power needs with fiscal responsibility. It is a continuing commitment.

Meeting the public's expectations for a healthy environment is an intrinsic part of the core business of Ontario Hydro. For our business is to serve, to help make sure Ontario remains a great place to live.

The world is much changed in the eight decades since Sir Adam Beck and his colleagues initiated what is now Ontario Hydro. It is clear that electricity has been a major contributor to that change.

A low-cost, reliable supply of electricity has provided an economic underpinning for the continued growth of this province. As a result, it has played a major role in enhancing the quality of life in Ontario.

We are producing and using electricity today in ways never dreamed of in Sir Adam's time.

But even as technological advances have changed our world, they have brought with them new attitudes. For example, as our knowledge grows about the effects of industry on the environment, so does our duty to mitigate that impact.

We are proud of Ontario Hydro's record of environmental sensitivity, and this year's annual report highlights some of our activities. We have always worked to produce electricity economically, reliably, safely and in a socially responsible and acceptable manner.

However, with new knowledge comes the opportunity and responsibility to continue to improve.

The province's economic growth will increase pressure on Ontario Hydro's ability to meet demand even as we work to protect the environment. Since the recession earlier this decade, the demand for electricity has exceeded Ontario Hydro's most likely forecasts. In 1986, demand rose by 3.9 per cent; this year by 4.9 per cent. On average, the demand for electrical energy has grown each year by an amount equal to the needs of a city the size of Hamilton.

We expect to be able to meet that growth into the mid-1990s with the existing system, plus energy efficiency programs, and generation and transmission facilities now approved and under construction.

In December, Ontario Hydro released to the Minister of Energy its Demand/Supply Planning Strategy, a comprehensive review of all options for meeting electricity needs beyond the 1990s. The study will provide a framework for extensive public and government review, leading to a final strategy.

Inherent in this process is the recognition that any decisions Ontario Hydro and the people of the province make together must not put the environment at risk. It is crucial to our quality of life, and to that of our children, grandchildren and beyond.

It has been a privilege to be chairman of Ontario Hydro. I would like to thank the Board of Directors, all Ontario Hydro employees and the municipal utilities for all their help.

Inevitably, any man-made installation has an impact on the environment. For Ontario Hydro, whose operations span the province, that fact is at the root of a corporate commitment to minimize the effect of our operations on Ontario's natural heritage.

Meeting that commitment is never easy. As a business Ontario Hydro must also address our two other fundamental goals: to supply reliable power and to do it at low cost.

There is no doubt that Ontario Hydro is part of the problem: our operations do affect the environment. But we have the resources and the willpower to offer solutions as well.

In our earliest planning, we work to anticipate and minimize environmental impacts. This entails such things as designing defence-in-depth safety systems for nuclear plants, shifting transmission lines to save rare habitats and building fish ladders to aid migration.

We've also had to respond to new problems that develop in older technologies. For instance, since the potential hazards of PCBs were identified, Ontario Hydro has been phasing out the use of equipment containing them. As well, we have developed a mobile decontamination unit that removes low-level PCBs from insulating oils.

We are committed to meet or better government standards or our own tough benchmarks. In most cases, we are successful. There are exceptions. We do make mistakes. But we try to learn from them, to ensure they remain isolated incidents.

Despite efforts such as these, we are well aware there is much work to do in some areas. In the case of acid rain, we have met government regulations for reducing acid gas emissions. Overall, we have reduced emissions since 1982 by 25.8 per cent.

But we have our work cut out for us in the years ahead. Acid gas control regulations get progressively tougher until 1994 and uncontrollable circumstances can affect the year over year results. For instance, although Ontario Hydro emissions were below regulated limits in 1987, they were 25 per cent higher than in 1986 due to robust growth in the economy and a reduction in water for hydraulic generation.

All this means an even greater commitment from Ontario Hydro, especially since environmental work cannot be carried out in isolation from the other legitimate demands of society that Ontario Hydro provide its product and services reliably and at the most reasonable cost.

We are working to meet those demands as well. In 1987, Ontario Hydro continued to be financially self-sufficient while maintaining rate increases at or near inflation. Total revenues were up from 1986 because of increased electricity sales. Late this year, a 4.7 per cent average rate increase was set for 1988 to meet higher costs of operating and maintaining existing facilities.

In the next decade, annual energy consumption is expected to climb by a cumulative 29 per cent. We'd like it to be less, and we will be initiating more energy saving programs to address that objective. But in all probability, in a growing province, total energy consumption will rise. To meet that increase and maintain the integrity of the environment will test our ingenuity in maximizing the productivity of our existing system and in making sensible choices about future supply, from whatever source.

The employees of Ontario Hydro share the broader community's desire for clean water, pure air and a healthy ecosystem. Thus, the corporate commitment to minimize the impact on the environment is based on a personal commitment from each of the 24,000 people who make up Ontario Hydro.

It gives me great confidence for the future to be associated with people who have demonstrated time and again such dedication to this organization and to the people of the province.

I would like to thank retiring Chairman Tom Campbell, whose work encompassed projects crucial to the province's future power supply, such as the successful review of Darlington Nuclear Generating Station and the development of the Demand/Supply Planning Strategy. Tom's foresight and leadership produced a fine record of achievement in his four-year stewardship.

DEMAND FOR ELECTRICITY CLIMBS 4.9 PER CENT

In 1987, Ontario Hydro continued to meet record demands for electricity. A total of 133 billion kilowatt-hours of electricity was delivered to primary and secondary customers. Primary demand rose to 126.5 billion kilowatt-hours, 4.9 per cent higher than the 1986 demand and 1.2 per cent higher than forecast. Electricity demand has increased steadily by an average annual growth rate of about 4.6 per cent since Ontario started to recover from the recession of the early 1980s. Ontario Hydro also sold 6.5 billion kilowatt-hours of electricity to utilities outside Ontario, chiefly in the United States.

The 1987 annual peak demand was 20.5 million kilowatts, 0.7 per cent lower than the 1986 annual peak. This slightly lower peak was due primarily to unseasonably mild temperatures during December.

MEETING CUSTOMERS' ELECTRICITY NEEDS

Ontario Hydro produces electricity from three major sources: hydraulic, fossil-fuel (predominantly coal), and nuclear. In 1987, hydraulic generation supplied 23.8 per cent, fossil-fuelled generation supplied 23.9 per cent, and nuclear generation supplied 47.5 per cent of the electricity required to meet customer demand.

Unusually dry and warm weather conditions resulted in lower water levels in 1987 forcing Ontario Hydro to burn 49 per cent more coal than forecast. In 1987, there were about 5.5 billion kilowatt-hours, or 15 per cent less hydraulic energy available than in an average year.

The remaining 4.8 per cent of Ontario's power requirements were met through purchases from other utilities, chiefly Hydro-Quebec and Manitoba Hydro. Ontario Hydro buys power from other utilities to help meet peak demand, to help supply electricity during emergency outages, and to reduce acid gas emissions. In 1987, Ontario Hydro agreed to buy 200 megawatts of power from Manitoba for five years starting in 1998.

AVERAGE COST OF GENERATION

Henry Kowalyk (front) and Scott McKinley of Ontario Hydro's Research Division work with BC Hydro to test the response of smolts, sockeye, and salmon to various diversion technologies including sound, strobe lights, and nets and screens.

Managing Environmental Effects

Electricity cannot be produced and distributed without some effects on the environment. Recognizing that, Ontario Hydro's governing direction is to manage all activities affecting the environment in an ethical and socially responsible manner. Ontario Hydro's environmental policies include developing operational methods and new technology to minimize environmental effects.

Hydraulic Resources: Respecting Borrowed Waters

Ontario Hydro uses water to generate electricity directly, and for cooling at fossil-fuelled and nuclear generating stations. It is Ontario Hydro's responsibility to ensure that water borrowed to make electricity is returned with minimum change to lakes and rivers, and that the environment around all generating stations is preserved. That responsibility is met through a number of programs designed to overcome the different potential problems associated with using water for generating electricity, or for cooling.

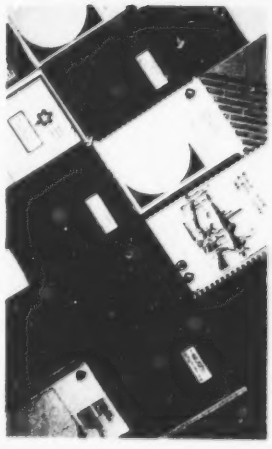
Fish Diversion

Occasionally, the water intake tunnels at fossil and nuclear generating stations are blocked by fish. Ontario Hydro has developed a number of methods to divert the fish from the tunnels using such equipment as strobe lights, barrier nets, fish pumps and sonic devices. Ontario Hydro has also modified the design of water intake structures so they are less expensive and easier to build, and more effective at diverting fish than earlier designs. This new kind of intake structure has been installed at the Darlington Generating Station.

The Thunder Bay Generating Station has a unique "fish return" system. Fish entering the intake tunnel can be recovered and returned to the lake by travelling screens mounted with special buckets and a fish pump. Ontario Hydro has also installed fish ladders, such as the one at R.H. Saunders hydraulic station in Cornwall, to help migrating fish move around generating stations.

Water Flow and Quality

When a plant is built on a river system, the damming of water can change the river's level and flow. These changes are carefully controlled because they may affect fish and wildlife habitats. Wherever possible, stations



To identify, minimize and monitor environmental effects, and to satisfy government requirements, Ontario Hydro completes extensive environmental studies throughout the life of every project from pre construction to post operation.

At Six Mile Lake, Biological Survey Technician Terry Brown samples the water from lake bottom to surface to help determine the environmental effects associated with the possible redevelopment of the Big Chute Hydraulic Generating Station.

Ontario Hydro staff met with the community in Beardmore, on the southeast shore of Lake Nipigon, to discuss possible environmental effects of a hydraulic development on the Little Jackfish River.

are operated to accommodate fish and wildlife needs.

This year, the driest on record for many parts of northern Ontario, the Corporation released some of the water stored behind its power dams to rivers and lakes to maintain walleye, salmon and pickerel spawning.

Keeping the water safe by maintaining its natural quality is also important. During the year, in response to the provincial Ministry of the Environment's Municipal-Industrial Strategy for Abatement (MISA) program, Ontario Hydro undertook a pre-regulatory identification of the chemical properties in its water effluents at fossil-fuelled, nuclear and hydraulic generating facilities. To date, chemical concentrations have been found to be within the expected range for normal operating conditions.

Ontario Hydro has also developed a containment valve designed to prevent spilled oil from entering a watercourse in the event of a transformer failure. In 1987, Ontario Hydro began installing these valves at DeCew Falls, the first of 42 hydraulic stations to be equipped.

Dam Safety and Rehabilitation

Ontario Hydro regularly inspects and monitors its dams to make sure surrounding lands are not flooded. This year, a routine inspection revealed an unstable downstream slope on the DeCew Falls Generating Station headpond dam located on top of the Niagara Escarpment near St. Catharines. The slope was immediately stabilized.

The rehabilitation of Crystal Falls Dam, northwest of North Bay, was also completed in 1987; the main dam was replaced and new sluice gates were installed.

In addition to routine inspections, Ontario Hydro continued to evaluate the safety of its nearly 300 dams, according to modern engineering standards, as part of a special seven-year Dam Safety Assessment Program initiated in 1986.

Managing Shorelines

Changing water levels and river flows can contribute to the problem of erosion of reservoir shorelines and river banks. To help ease the problems of shoreline and river bank erosion, Ontario Hydro installs protective materials, such as rock layers, where necessary. Ontario Hydro stabilized the river banks along the Arnprior Generating Station reservoir, northwest of Ottawa, in this way in 1987.

Tapping more water power

As most of Ontario's accessible water power was developed before 1960, few opportunities for developing large and economical hydraulic stations now exist in the province. However, Ontario Hydro is studying the possible development of additional hydraulic sites or redevelopment of existing hydraulic stations to tap a potential of about 1000 megawatts of water power.

One of the first steps in every project is to determine possible environmental effects caused by a man-made installation.

In northern Ontario, field studies for the Little Jackfish and Mattagami Rivers are complete. An environmental assessment of Little Jackfish is being prepared for submission to the Ministry of the Environment in early 1988. As well, environmental studies are nearing completion on the Mattagami River development.

Ontario Hydro is also investigating the possibility of redeveloping Big Chute Generating Station on the Severn River, and adding additional generating facilities at Niagara Falls.

And Ontario Hydro continues to encourage the economic development of smaller hydraulic sites. Numerous proposals for small private hydraulic plants have been reviewed and are in various stages of planning and development. Seven projects, together producing a total of six megawatts, started selling power to Ontario Hydro in 1987.

FOSSIL FUEL - MAKING A VITAL CONTRIBUTION

Ontario Hydro's fossil-fuelled generating stations provide the system with the flexibility required to meet peak loads or cover outages at other plants.

Ontario Hydro and Ducks Unlimited Canada work together to preserve this 50-hectare wetland behind the Lennox Thermal Generating Station near Kingston. This marsh is home to ducks, terns, shorebirds, beavers and muskrats.

In 1987 the performance of Ontario Hydro's fossil-fuelled stations was a key factor in maintaining system reliability in the face of high energy demands and low water levels. Ontario Hydro burned 49 per cent more coal than expected and, as a result, acid gas emissions were 25 per cent higher than in 1986 but still 30,000 tonnes below the government limit.

Acid gas emissions are a combination of chemicals released during the coal combustion process. The chemicals most prominent, and of most concern, are sulphur dioxide and nitrogen oxide.

In 1981, Ontario Hydro announced a program to reduce acid gas emissions by almost 50 per cent beginning in 1986.

In 1985, the Ontario government announced a new regulation under the Environmental Protection Act which set still stricter limits on Ontario Hydro's acid gas emissions during the 1986 to 1993 period, and a new lower limit to be achieved by 1994.

Ontario Hydro will work to meet provincial government regulations limiting acid gas emissions (sulphur dioxide and nitrogen oxide) to 215,000 tonnes by 1994, 60 per cent below the 1982 peak level of 531,000 tonnes.

Reducing Pollution

To reduce acid gas emissions overall, Ontario Hydro runs its system using less fossil fuel and more nuclear and hydraulic generation whenever possible. To reduce sulphur dioxide emissions in particular, Ontario Hydro purchases coal that is washed before delivery, burns lower sulphur coal from western Canada, and blends low-sulphur western Canadian coal with U.S. coal.

To reduce nitrogen oxide emissions, Ontario Hydro has installed low nitrogen-oxide burners at Nanticoke Generating Station. During 1987, the last three of Nanticoke's eight units were fitted with low nitrogen oxide burners. To date, with all eight units now modified, a 35 per cent reduction in Nanticoke's nitrogen oxide emissions has been achieved with some loss in combustion efficiency.

New Programs

This year, Ontario Hydro announced a major program to test the potential costs, benefits and problems of installing acid

ACID GAS EMISSIONS

gas control equipment at its three largest coal-fired generating stations, Nanticoke, Lakeview and Lambton. Provincial government approval, under the Environmental Assessment Act, is required before major modifications can be made to the stations. Approval will be sought for four scrubbing technologies: wet limestone scrubbing, a limestone dual alkali process, a lime spray dryer process, and limestone injection. Over the next three years, Ontario Hydro will spend an estimated $7.7 million consulting with the public, assessing the technologies and environmental effects, and seeking government approvals.

Lennox returned to operation

In November, two of the four 550-megawatt units at Lennox Thermal Generating Station were returned to operation to maintain service reliability. These units are fuelled by residual oil, a refinery by-product with a low sulphur content of 0.7 per cent. The plant was mothballed in 1982, when primary load growth was lower than expected.

Managing Ash

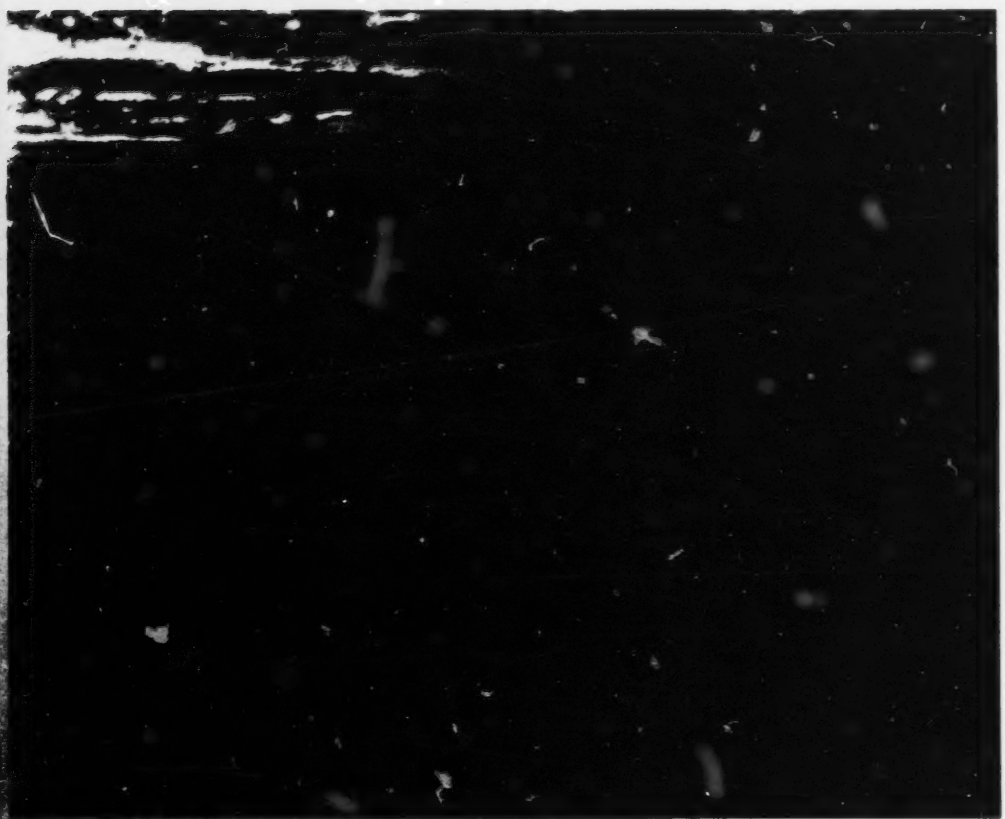
Keeping the environment clean means disposing of the large quantities of ash produced from burning coal. The combustion of coal produces some coarse ash which falls to the bottom of the boiler, and tiny dust particles, called fly ash, 99 per cent of which are collected in electrostatic precipitators.

Ontario Hydro sells as much of the ash as possible. Some fly ash is used to make cement and as an additive to concrete mixtures. Bottom ash is used as gravel.

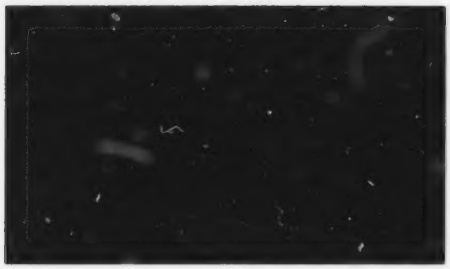
In 1987, a system was added at Lambton Generating Station near Sarnia to collect dry fly ash so it could be used by a local waste management company to stabilize liquid wastes. Revenue from the sale of ash will cover the cost of the system in two years. Also in 1987, Lakeview's fly ash was sold to cement companies for use as an additive to concrete mixtures.

The ash that is not sold is buried in landfills built and managed by Ontario Hydro to prevent water pollution from runoff and leachings. Blowing dust from the sites is controlled by water sprays, bonding agents, and slag and vegetation cover. When the landfill site is full, it is revegetated.

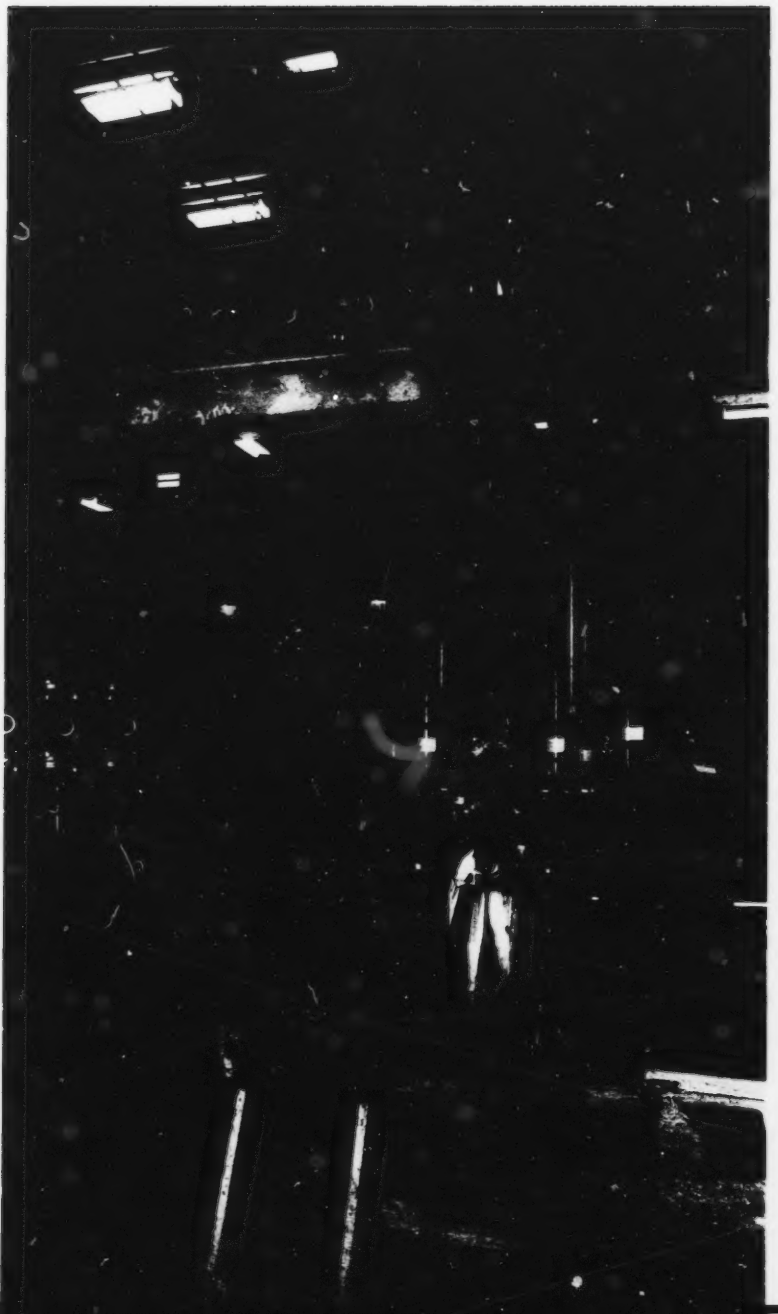
As part of the Ontario Ministry of the Environment's Municipal Industrial Strategy Abatement (MISA) program, Stan Howser takes pre-regulatory samples of the water discharged from the Lakeview Generating Station.



To reduce acid gas emissions, Ontario Hydro designed and built the Thunder Bay Generating Station Extension to burn low-sulphur western Canadian coal. In all, Ontario Hydro's coal-fired stations contribute about 20 per cent of Ontario's acid gas emissions.



Ontario Hydro stockpiles coal at its fossil stations because it cannot be delivered during the winter months. By spraying the coal with water and waste oils, Ontario Hydro controls the blowing of coal dust year-round.



Ontario Hydro has been developing a limestone injection desulphurization process at Lakeview Thermal Generating Station in Mississauga. By injecting limestone directly into the boiler furnace, this process can reduce sulphur dioxide emissions by more than 50 per cent.

Nuclear Energy – An Increasing Role

Ontario Hydro's CANDU reactors generate electricity safely, economically, reliably and with minimum impact on the environment. Designed to shut down safely in the event of equipment failure, human error, or various combinations of both, these reactors have fast shutdown and vacuum systems to ensure safe operation and to prevent radioactive emissions from escaping into the atmosphere.

In 1987, construction continued at the Darlington Nuclear Generating Station. Darlington, scheduled to be producing power by 1989 will, when completed in 1992, provide 3600 megawatts of power, enough to meet the electricity needs of a population the size of metropolitan Toronto.

At the Bruce Nuclear Generating Station, Unit 8 went into service in May, two months ahead of schedule. Bruce Unit 5 surpassed the world record for continuous operation; it was connected to the electrical grid for 475 days.

The retubing of Units 1 and 2 at Pickering Nuclear Generating Station was completed, and Unit 1 was returned to commercial operation in October. Unit 2 is expected to return to service in mid-1988.

Both units were taken out of service in 1983 when inspection of a failed pressure tube in Unit 2 signalled the end of the operating life of all pressure tubes in those units. Three hundred and ninety pressure tubes were replaced in each of the two 540-megawatt units. The workers were exposed to about one-third of the anticipated radiation exposure.

In 1987, during a routine inspection by Ontario Hydro and Atomic Energy of Canada Ltd., sample pressure tubes in Pickering Units 3 and 4 were found to be deteriorating faster than expected. As a result, the retubing of Pickering Units 3 and 4 will be advanced by approximately ten years.

In September, the CANDU reactor located at Rolphton was permanently shut down. This 22 megawatt reactor, owned by Atomic Energy of Canada Ltd. and operated by Ontario Hydro, went into operation in 1962 to demonstrate the technical feasibility of CANDU nuclear generation, and to provide operating experience as a basis for the design, construction and operation of larger CANDU stations. Although intended only to demonstrate the CANDU concept, Rolphton contributed power to the electricity grid for 25 years.

Ontario Hydro's CANDU units continued to rank among the world's top performing reactors. In 1987, seven units ranked in the top 15 in lifetime performance.

Nuclear Safety

Ontario Hydro's nuclear stations are designed and operated to protect employees, the public and the environment from radioactive emissions.

In over 20 years, more than 120 million person-hours, of Ontario Hydro nuclear plant operating experience, there has never been an on-the-job fatality at an Ontario Hydro nuclear generating station, and there has never been a radiation exposure resulting either in measurable injury to an employee or in a measurable exposure to a member of the public.

In fact, the average annual worker radiation exposure dropped to 0.4 rem in 1987, less than one-tenth of the annual exposure permitted for any one worker by the Atomic Energy Control Board. This reduction has taken place in spite of the major rehabilitation work at Pickering.

From left to right: Gunny Mentes, Wolf Jenkner, Al Christie, Ray Effer, Steve Griffiths and Emand El'saved, review the blueprints of the water intake structure at Darlington, which was designed by this team to prevent fish from entering the system.

Another important project undertaken by Ontario Hydro which also increases worker and public safety by helping to reduce radiation exposure is the tritium removal facility at Darlington. Designed to enable Ontario Hydro to use heavy water longer, the tritium removal facility will remove radioactive hydrogen from the heavy water used in the reactor systems at Ontario Hydro's nuclear stations. The facility is expected to begin operating in 1988.

As an extra safety measure, the air and water flowing from all nuclear stations are monitored by Ontario Hydro. Federal and provincial agencies ensure that concentrations of radioactivity are within limits. They regularly analyze surrounding air, precipitation, milk, drinking water, algae and fish.

Also in 1987, Ontario Hydro participated in the Ontario Nuclear Safety Review. In 1986 the Ontario Energy Minister, acting on a recommendation by the Select Committee on Energy, appointed Professor F. Kenneth Hare to undertake the Ontario Nuclear Safety Review. The Review will report to the Minister of Energy early in 1988 on the safety of the design and operating procedures and emergency plans associated with Ontario Hydro's CANDU nuclear generating plants.

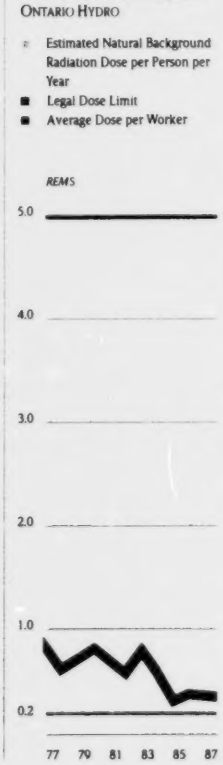
Employing Highly-Qualified Staff

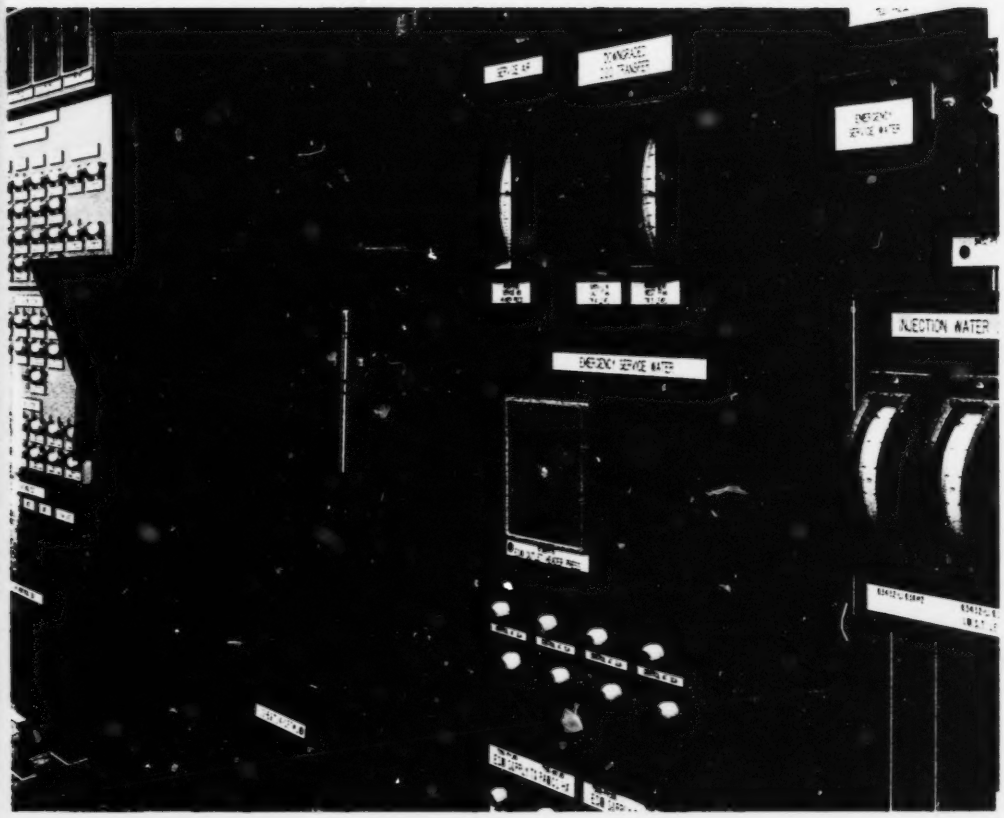
Ontario Hydro's nuclear operators and supervisors must meet high academic and security standards. Station control room operators receive at least eight years of training, followed by a series of demanding examinations set by Ontario Hydro and the federal Atomic Energy Control Board. After qualifying, operators take regular refresher training and demonstrate continued competence on training simulators.

Transporting Radioactive Materials

Ontario Hydro's careful packaging, compliance with legislation and regulations, driver/vehicle safety program and emergency response capabilities assure the

Annual Average Radiation Dose per Nuclear Worker at Ontario Hydro





Ontario Hydro's nuclear station operators undergo a lengthy and rigorous training period. Here, from bottom left to centre right, Kerry Arnott, Steve Chornie, Mark Elliott, Randy Lockwood and Mike Lee, familiarize themselves with the control room at Darlington.

safe transportation of radioactive materials.

Since 1963, Ontario Hydro has made thousands of shipments of radioactive material over millions of kilometres. In that time three vehicular accidents have occurred, none of which resulted in any radiological danger to the public or the environment.

In the event of an accident, Ontario Hydro uses an independently evaluated emergency response plan which is considered a model by Transport Canada.

Nuclear Fuel Waste

Fuel bundles from nuclear reactors are highly radioactive and must be kept cool for some years after discharge. To achieve this, they are stored in water-filled pools at each nuclear generating station. For more than 20 years, this method has proven safe, reliable and efficient. Because the compact fuel bundles require so little space for storage, this method can be used well into the next century.

Ontario Hydro is working with Atomic Energy of Canada Limited studying other possible short-term and long-term fuel storage methods.

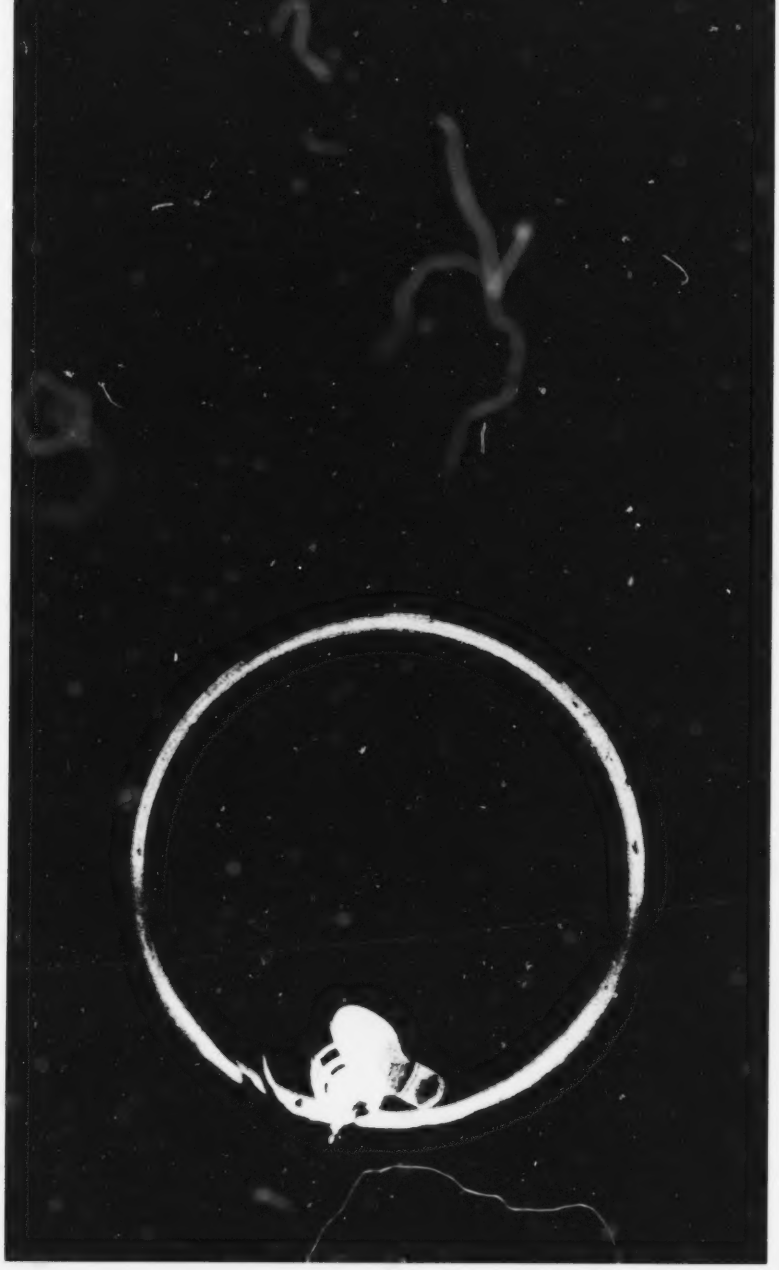
Delivering Electricity Carefully

In addition to producing enough electricity to meet the province's requirements, Ontario Hydro must be able to deliver that electricity where it is needed, when it is needed. It is crucial to ensure the safety of those living near power corridors and to minimize damage to the surrounding natural environment.

In response to some public concerns about electric and magnetic fields, Ontario Hydro has expanded its activities in this area. Based on evidence to date, the scientific community agrees no public health risk has been established. However, Ontario Hydro, working with other utilities, is developing a risk assessment program to contribute to the resolution of public concerns. Ontario Hydro has also compiled a comprehensive database of scientific and legal information related to electric and magnetic field effects. This database is used internationally by the research community.

The effect of transmission lines on the environment is also addressed. When selecting a site for the transmission corridor, Ontario Hydro's policy is to

The warm water discharged from Pickering Nuclear Generating Station is used by Coolwater Farms Inc. to breed fish commercially.



Nuclear station components and systems are tested and inspected constantly throughout the life of every station. In this photo, one of the spray headers inside the vacuum building at Bruce is being removed for laboratory study.

As an extra safety precaution, Ontario Hydro is developing the capability to test the filters in respirator masks used by nuclear workers. Here, Dr. Helen Leung of Ontario Hydro's Research Division checks a filter.

avoid, where possible, recreational areas, forests, prime agricultural lands, lakes, rivers and streams susceptible to erosion problems, scenic areas, waterfowl, moose and deer habitats, and rare and endangered flora and fauna areas.

Once a transmission corridor has been approved by government, Ontario Hydro makes every effort to improve the aesthetic impact of the lines by selecting the transmission design most compatible with its surroundings, by landscaping, and by encouraging beneficial secondary uses of the altered land, such as parks and garden plots. This holds true for transformer stations also. For instance, in 1987, Ontario Hydro completed its reconstruction of the Toronto Cecil Transformer Station. The exterior of the building was renovated to blend in better with the neo-Victorian architecture of the neighborhood. Ontario Hydro worked with community and City of Toronto representatives.

New Transmission Lines

During 1987, new major transmission lines were brought into service for the first time in nearly five years. East of Toronto, the second 500-kilovolt double-circuit line from Cherrywood to Bowmanville was placed in service in May. As part of Ontario Hydro's acre-for-acre reforestation program, it donated 60,000 seedlings to the Central Lake Ontario Conservation Authority to replace trees that had to be cut down to build the transmission line. Further north, near Thessalon, the 500-kilovolt single-circuit Hanmer-to-Mississagi line was placed in service in November. This line will operate initially at 230-kilovolts.

Plans and approval for major new 500-kilovolt transmission facilities in southwestern Ontario involved extensive environmental studies by Ontario Hydro. Approval for two 500-kilovolt transmission lines, one from Bruce Nuclear Power Development to a new transformer station near London, and the other from London to Nanticoke Thermal Generation Station, was granted by the Provincial Cabinet in June. Ontario Hydro held public information meetings to discuss the coming survey, property acquisition and construction phases of the project with over 1400 property owners and tenants along the route.

For five years, during and after construction, Ontario Hydro will monitor soil compaction, crop yield and land loss at towers as well as the effect of construction on tile drainage. Ontario Hydro will also evaluate the effect of its new narrow-base towers designed specifically for agricultural lands. These new towers use less land than other tower designs.

Ontario Hydro also resumed construction in Kanata on the Kingston to Ottawa transmission line. Work on the line stopped after a community group made an appeal to the Ontario Cabinet to review again any possible health effects. After considering the case, the Cabinet authorized Ontario Hydro to proceed with its work.

Ontario Hydro has also started its environmental studies to determine the best locations for future transmission facilities west and southwest of London to meet the growing electricity demand in the Windsor, Chatham and Sarnia areas.

Controlling Vegetation with Herbicides

The uncontrolled growth of brush and trees on some of Ontario Hydro's 200,000 hectares of transmission and distribution line rights-of-way and station sites can cause power failures and create a public or employee hazard. Therefore, the Corporation uses herbicides, along with some mechanical and manual methods, to control vegetation that may grow too close to electrical installations.

Only herbicides registered by the federal government and approved by the province are used by Ontario Hydro. These are applied in a selective manner so that vegetation not posing a problem is preserved. Herbicides are used in strict accordance with government regulations by staff trained in their use and supervised by employees licensed by the Ministry of the Environment.

In addition to herbicides, Ontario Hydro also controls vegetation manually, for example, when brush is too high, or where environmental conditions dictate. Landowners are also given the option to cut vegetation.

Ontario Hydro is continuing to develop and improve techniques to reduce herbicide use through such methods as encouraging the natural regeneration of low-growing ground cover and the seeding of cover crops.

Taking Care of PCBs

Since polychlorinated biphenyls (PCBs) were identified in the 1970s as an environmental hazard, no new uses have been permitted. Many utilities, including Ontario Hydro, still use equipment containing PCBs as an insulator and fire retardant in electrical transformers and

Up to 30,000 Canada Geese land at the Jack Miner Bird Sanctuary in Kingsville every year during migration. This summer, to protect the migrating birds, Ontario Hydro buried the distribution line which ran parallel to the Sanctuary.

capacitors. Handling, storing and transporting this material safely while it is phased out is a priority at Ontario Hydro.

The Corporation has a number of programs under way to eliminate its PCB inventory and to ensure government regulations are met.

During the year, Ontario Hydro's Regions Branch conducted comprehensive audits of its field operations to ensure proper practices and procedures for the handling, storage, safety and record-keeping of PCBs are in place.

In addition to this control program, Ontario Hydro developed a mobile PCB-decontamination unit that chemically removes low-level PCBs from insulating oils so the oils can be reused. In August, the Ministry of the Environment granted the necessary approvals for operating this unit, and the first commercial operation took place in October. By year end, 85,000 litres of contaminated oil, stored at an Ontario Hydro site in Etobicoke, had been cleaned. A second decontamination unit has been ordered to expedite the clean-up.

DEMAND MANAGEMENT - WORKING WITH THE CUSTOMER

Ontario Hydro markets electricity as a reliable, efficient and valuable energy form, suited to meet customers' needs in a wide variety of applications. At the same time, Ontario Hydro's objective is to manage electricity demands in a way that reduces or defers the need for new facilities. Demand management, by trying to make the best overall use of resources for the province, may also be a plus for the environment. The less electricity that has to be produced, the fewer facilities required to generate and distribute it, thereby diminishing associated environmental effects.

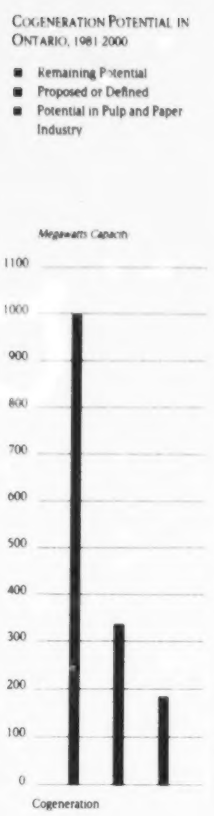
Effective demand management means working with customers to reduce waste, improve electricity efficiency, and develop new uses for electricity which represent a benefit for the customer and for the province.

Components of Ontario Hydro's demand management activities include natural and strategic (utility-induced) conservation, parallel generation and cogeneration, load shifting and time-of-use rates.

Conservation

By making the public more aware of energy efficiency programs and financial incentives,

COGENERATION POTENTIAL IN ONTARIO, 1981 2000



Ontario Hydro expects to encourage electricity users to conserve enough power by the year 2000 to reduce demand by at least 1000 megawatts.

One effort to promote more efficient use of electricity is the energy monitoring program. Launched in conjunction with the Ministry of Energy in 1986, this program offers a system to measure more precisely the energy consumed by a specific portion of an industrial process. Fuel savings to the consumer are expected to average about 16 per cent with a typical payback period of one year. During 1987, nine companies across the province signed up to participate in the program.

Rate Incentives, Flexible Financing

Rate incentive programs have been developed to help pulp and paper industries modernize their operations. By converting to electromechanical pulping, a more efficient process that streamlines operations and results in lower unit cost, companies can improve product quality and reduce pollution emission levels.

Ontario Hydro's commercial and industrial customers can also arrange more flexible financing for energy efficiency improvements. Through the EnerMark Business Finance Plan, sponsored by Ontario Hydro and the Canadian Imperial Bank of Commerce, most customers can obtain 100 per cent financing.

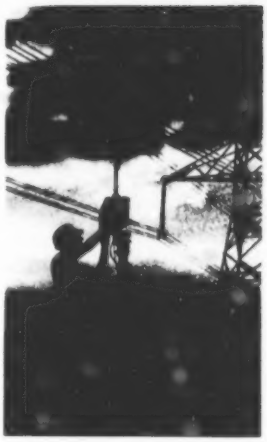
Parallel Generation

Parallel generation refers to electricity generated from a private source, not owned or operated by Ontario Hydro, but connected to its system. Ontario Hydro estimates up to 1000 megawatts of electrical power may be available from parallel generation by the year 2000.

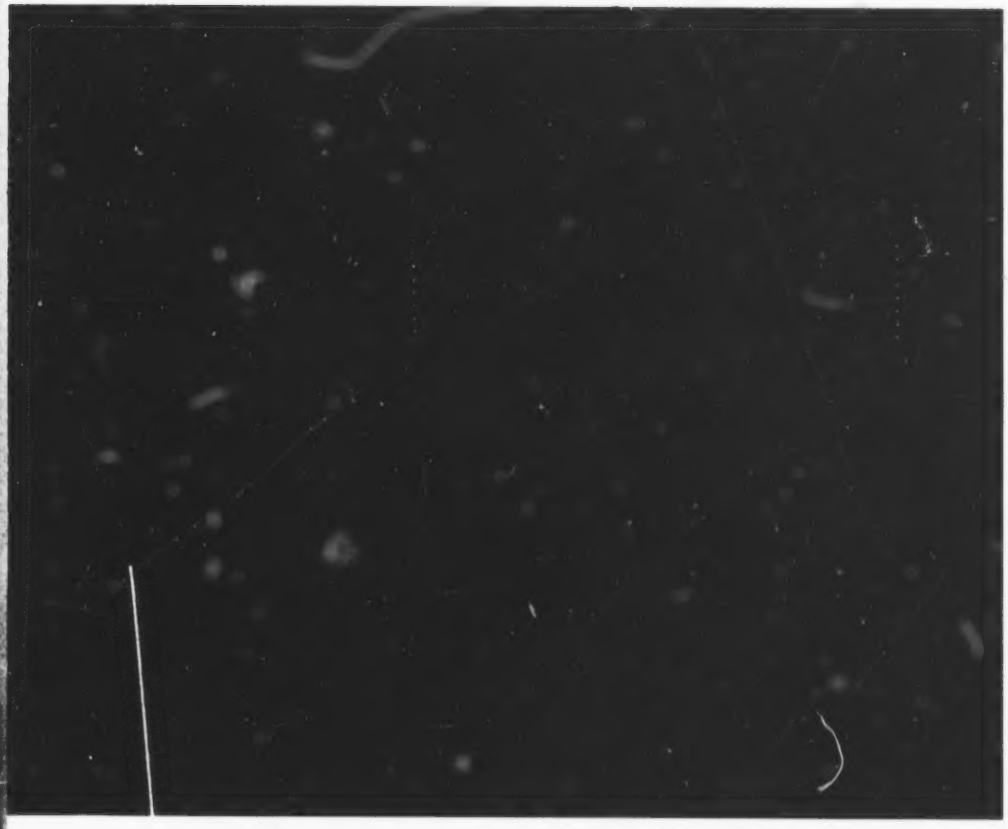
At the end of 1987, Ontario Hydro was buying close to 26 megawatts of parallel power from 22 parallel generators. In 1987, Ontario Hydro raised the purchase rates to 3.60 cents a kilowatt-hour from 3.25 cents for capacity factors of 65 per cent or higher.

Cogeneration

Cogeneration, a form of parallel generation, involves the production of heat and electricity from a single fuel source. Ontario Hydro is encouraging the development of cogeneration projects in Ontario, particularly in the north, to help meet

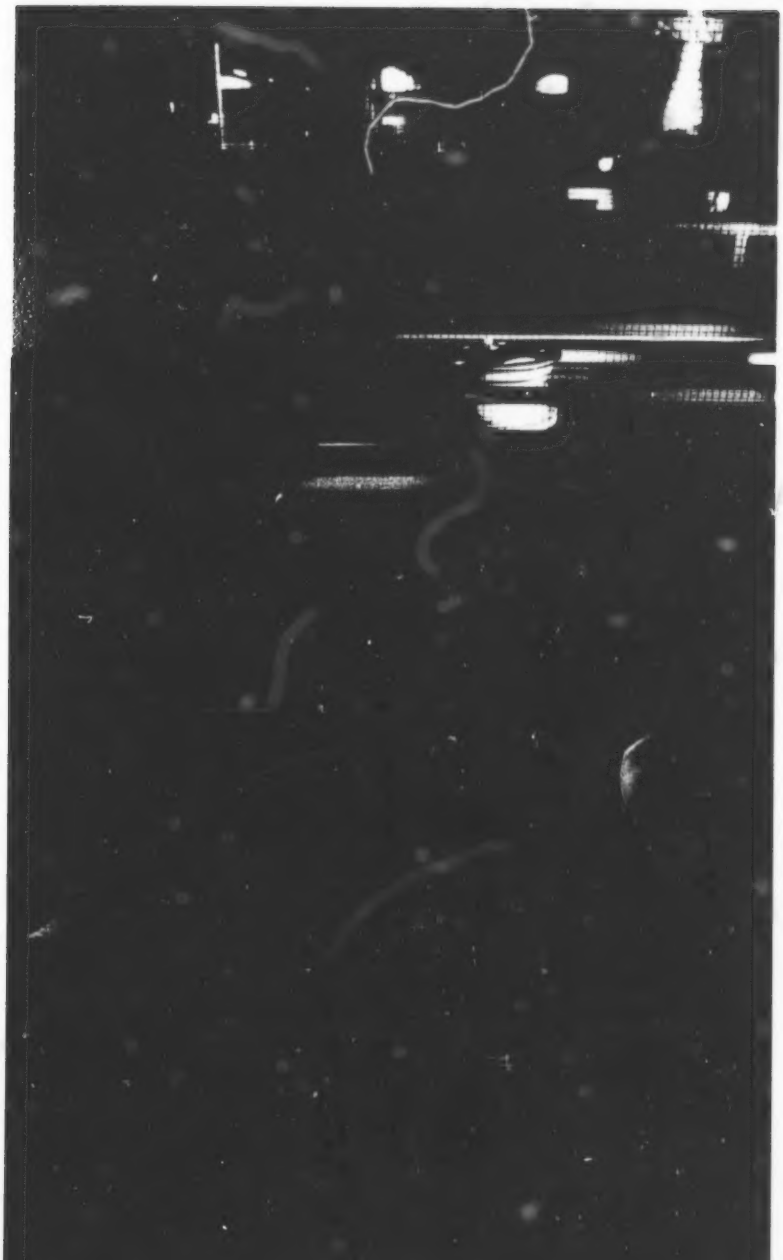


To ensure noise from transmission lines is within acceptable environmental limits, Ontario Hydro has been studying noise levels under different weather conditions for the past three years. Here, technologist Mike Colbert, takes measurements on an autumn morning at the Trafalgar test site in Milton.



Rather than relocating osprey nests, which can weigh up to 30 kilograms, Ontario Hydro will, whenever possible, widen the cross piece and shift the nest away from the line. Here, journeyperson Bill Curry adjusts an osprey nest on a newly constructed cross piece on a distribution pole near Belleville.

The reconstruction of the Cecil Transformer Station in downtown Toronto was completed in 1987. Ontario Hydro worked with repre sentatives from the City and the neighbouring community to change the exterior of the building.



Ron Brunstad, Accounting/Systems Supervisor at Volkswagen, and Don Fleming (right), Marketing Super visor at Ontario Hydro, discuss the energy monitoring system recently installed in Volkswagen's Barrie plant. The system will help lower electricity costs by reducing peak energy by up to 15 per cent.

electricity needs without building new facilities. Cogeneration now supplies about 500 megawatts of electricity in Ontario.

In 1987, Ontario Hydro and Great Lakes Forest Products Limited agreed to develop a new cogeneration plant in northwestern Ontario that will cut Ontario Hydro's requirement to supply the company's future energy needs by about 22 megawatts.

As well, Ontario Hydro and InterCity Gas continue to discuss a proposal to build a 75-megawatt cogeneration facility at Boise Cascade's Fort Frances site. InterCity Gas, the owner of the facility, would sell the steam it produces to Boise Cascade and the electricity to Ontario Hydro. A feasibility study is under way now.

Time-of-Use Rates

Ontario Hydro, the Municipal Electric Association, and the Association of Major Power Consumers in Ontario have agreed on a series of rate structure reforms which will allow Hydro to track costs more equitably and will help customers reduce their individual bills by managing their own electricity use. After review by the Ontario Energy Board, these reforms are expected to be implemented in 1989. Time-of-use rates will be applied initially to direct customers and large users within municipal utilities. Customers will be charged for electricity according to the time of day and season they use it. The rates will reflect the costs of providing electricity and will be lowest during the summer off-peak period and highest during the winter peak hours. Individual municipal utilities will have the option of adopting time-of-use rates in 1989.

Related Business Activities

Ontario Hydro is involved in a number of secondary activities related to the production of electricity. For example, Ontario Hydro exports its design, construction and operating expertise in the electricity field to countries around the world. In 1987, the Canadian Exporters Association recognized Ontario Hydro's New Business Ventures Division as one of Canada's outstanding exporters.

During the year, government and utility delegates from Brazil spent a week at Ontario Hydro examining how to incorporate environmental considerations into the planning and design stages. Procedures for developing and establishing policies to offset the environmental effects of an electric utility were also studied. In other technological areas, Ontario Hydro continued its consulting work in Ghana, Egypt, Pakistan, Yemen, Kenya and several other countries. New contracts were signed for consulting work with Belize, Ethiopia and Zimbabwe.

The Corporation also sells heat energy, in the form of steam, for commercial and industrial uses. Ontario Hydro is participating in the promotion of heat energy use at the Bruce Energy Centre, an industrial park east of the Bruce Nuclear Power Development in Bruce County. In 1987, Bi-Ax International Incorporated and Bruce Tropical Produce Incorporated, both Canadian-owned companies, became the first customers to build facilities at the Bruce Energy Centre.

Other Energy Options

Ontario Hydro continues to explore a broad range of energy options, such as fuel cells, fusion fuel, municipal solid waste, and wind and solar generation. In the past several years, Ontario Hydro has studied wind and solar power in particular, as they may prove economical in remote locations.

Because Ontario is one of the least windy areas in North America, wind generation is not practical for most of Ontario. However, wind turbines may prove to be feasible in remote communities where wind currents are stronger and electricity is generated from more costly diesel power plants. To test this potential, Ontario Hydro installed a 60 kilowatt turbine at Fort Severn which began producing power in 1987.

Sunlight, converted directly to electricity through photovoltaic cells, is another potential energy resource. Although the cost of these cells has decreased dramatically over the years, it is still too high for all but remote applications where it can provide an economic alternative to expensive diesel power. Ontario Hydro has solar cell test facilities north of Atikokan, and at the Kortright Conservation Centre near Toronto. The most recent installation, at Big Trout Lake, in northern Ontario, is Canada's largest. Three hundred photovoltaic modules produce up to 11 kilowatts of power, reducing the use of diesel fuel.

Ontario Hydro's Work Environment

Ontario Hydro relies on its staff of about 24,000 regular employees and 8,000 temporary and construction staff to keep the province's large electricity system producing and delivering power.

During the year, Ontario Hydro continued to work with employees to ensure a satisfying work environment. In March,

Renewable energy options such as wind powered electrical generation can play an important role in specialized applications. In 1987, a wind turbine installed at Fort Severn, on Hudson Bay, began producing power to displace some of the costly diesel fuel used in the local generator.

Ontario Hydro and the Ontario Hydro Employees' Union reached a landmark voluntary three-year collective agreement. The Society of Ontario Hydro Professional and Administrative Employees, another employee group representing some 6600 administrative, supervisory, engineering, and other professional staff, continued to seek certification as a trade union.

To support the health and well-being of its employees, Ontario Hydro initiated a program to reduce exposure to tobacco smoke at the workplace a year ago. In 1987, smoking was prohibited in the workplace at Ontario Hydro's Head Office and Toronto locations.

The quality of Ontario Hydro's safety programs at its construction and operating sites was confirmed again in 1987. This was the third consecutive year there were no on-the-job fatalities.

Affirmative Action

Ontario Hydro's provincially recognized Affirmative Action program continued to encourage the movement of qualified women into all major job categories. Overall, the representation of women increased from 17.9 per cent of the regular staff in 1986 to 19 per cent at the end of 1987. The number of women on the Executive Salary Roll increased from 3.3 per cent to 3.4 per cent; in the Management and Professional category from 8.7 per cent to 9.7 per cent; and in the Trades, Technical and Operators category from 2.8 per cent to 3.6 per cent.

Maternity leave benefits improved in 1987. As a result of labour negotiations, benefits increased to 93 per cent of salary for normal maternity leave.

In July, President Bob Franklin announced a corporate Employment Equity Program expanding the mandate of the Affirmative Action Program to include visible minorities, aboriginal and disabled persons.

THE PUBLIC ENVIRONMENT

Ontario Hydro, as a public utility, is accountable to the people of Ontario. To understand and respond to the varying needs and expectations of its customers, Ontario Hydro, in addition to the daily exchanges between employees and the public, consults with the people of Ontario through formal hearing bodies, informal consultations and tours of and visits to facilities.

This year Ontario Hydro spent about 85,000 hours and $5 million participating in public hearings before the Ontario Energy Board, the Select Committee on the Environment, the Special Acid Rain Committee of the House of Commons, the Standing Committee on Energy of the House of Commons, the Environmental Assessment Board, the Federal Ad Hoc Committee on Great Lakes Water Levels, and the Advisory Committee of the Federal Government's Energy Options Program. As well, Ontario Hydro participated in the Ontario Nuclear Safety Review.

Ontario Hydro works with communities and considers the effects of its projects and operations not only on the natural environment, but also on the social and community environment. Behind every project are years of planning with community members to moderate the effect of a new Ontario Hydro project on the local economy and culture, housing markets, school systems, leisure facilities and so on. While a project is under construction or in operation, close contact with the community is maintained to manage related effects.

To further strengthen public representation from every corner of the province, in 1987, the Ontario government appointed six individuals from northern Ontario to form a special advisory committee to provide northern Ontario residents with direct input into Ontario Hydro's decisions. The committee will deal with all aspects of Ontario Hydro's operations in northern Ontario, and make recommendations to the Ontario Hydro Board of Directors.

In less formal settings, more than 100,000 people visited Ontario Hydro's nine information centres located across Ontario. And Ontario Hydro Speakers' Bureau arranged 511 speaking engagements to community, business and service groups throughout the province.

FINANCIAL HIGHLIGHTS

Ontario Hydro's activities continue to be directed at achieving its primary purpose of providing the customers of Ontario with electricity at the lowest feasible cost over the long term consistent with high safety and quality of service standards. To accomplish this, Ontario Hydro encourages the effective use of resources and emphasizes productivity improvements and cost control.

Ontario Hydro's total revenues for 1987 amounted to $5,280 million, $427 million higher than in 1986. Approximately $232 million of this increase came from a greater volume of electricity sales, and $195 million from the 1987 rate increase. Total operating costs for 1987, including financing charges, amounted to $5,009 million, an increase of $403 million over 1986. This increase was primarily due to higher fuel costs and higher operating and maintenance costs. The net income for 1987 was $271 million compared with $247 million for 1986.

Cash provided from operations and available for investment in fixed assets was $1,204 million for 1987. The capital expenditures for investment in fixed assets during 1987 amounted to $2,524 million. This represents a decline over the period 1983 through 1987 as a result of the decrease in the level of construction activity.

RESULTS OF OPERATIONS

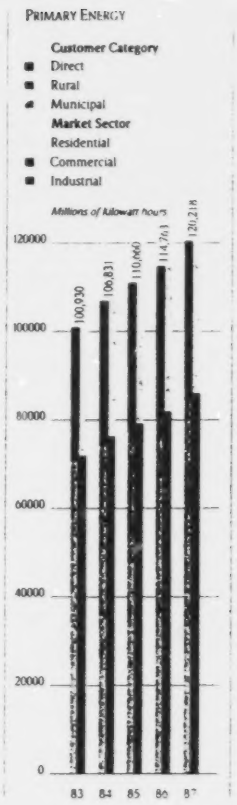
Revenues

Primary revenues for 1987 amounted to $5,084 million, an increase of $479 million or 10.4 per cent as compared with 1986. Electricity sales to municipal utilities, rural retail and direct industrial customers totalled 120,218 million kilowatt-hours. The overall growth rate in the volume of primary energy sales was 4.8 per cent for 1987, reflecting the effect of continued economic growth in the Province of Ontario and weather related factors. In 1987, electricity sales to municipal utilities and direct industrial customers grew more strongly than sales to rural retail customers. The chart provides the energy consumption by major customer category and an estimate of the energy consumed by market sector. The overall growth rate for 1987 was generally consistent with the average annual growth rate of 4.6 per cent over the last five years.

The 1987 electricity rates for primary customers increased 5.5 per cent on average. The average increases for municipal utilities, rural retail and direct industrial customers were 5.2 per cent, 6.6 per cent and 5.6 per cent, respectively. The rural rate increase takes into account $91 million in assistance provided by all electricity consumers in the province to reduce the electricity bills of year-round rural residential customers.

Secondary revenues for 1987, mainly from sales of electricity to United States utilities, amounted to $196 million. Compared with 1986, this represents a decrease of $52 million or 21.0 per cent. This decrease reflects a shift in the pattern of secondary sales from relatively higher-priced firm contract sales to interruptible, non-firm sales. In addition, this decrease is due to a more competitive export market as a result of lower oil prices for U.S. electric utilities which makes imports less attractive for them.

Over the last five years, Ontario Hydro has sold to U.S. utilities approximately 43,595 million kilowatt-hours of electricity beyond the requirements of its customers in Ontario and has earned approximately $1,665 million in secondary revenues. The net benefit to Ontario customers was $634 million for the period 1983 through 1987, and $61 million in 1987. This benefit helped Ontario Hydro to keep electricity rates lower for Ontario customers.



Major Electricity Production Resources

Ontario Hydro responds instantly and efficiently to the energy demands of its customers by supplying electricity from a number of different sources. Hydraulic generating stations, which are relatively inexpensive to operate, have traditionally provided a major part of the electricity energy generated by Ontario Hydro. With most major accessible sites in the province already developed, hydraulic generation, as a percentage of total generation,

has gradually decreased over the past few years. On the other hand, the Corporation has increased its emphasis on nuclear generation. This emphasis is part of Ontario Hydro's acid gas emission reduction efforts. The other major source of generation of electricity is fossil generation. The increased nuclear generating capacity reduces the need to operate coal-fired generating units which have higher fuelling costs. However, the fossil-fuelled units will continue to be required during periods of higher demand, when demand cannot be satisfied by less expensive generation. The electricity production resources for the period 1983 through 1987, illustrating the changes in volume and generation mix, are shown in the chart. The annual average cost per kilowatt-hour of energy by the major generating sources are shown in the Five-Year Summary of Financial and Operating Statistics.

Fuel and Fuel-related Costs

In 1987, fuel and related costs such as water rentals, power purchased, and the nuclear agreement payback were 20.1 per cent higher than in 1986. Ontario Hydro's nuclear stations supplied 47.5 per cent of the total energy to the system in 1987. Hydraulic stations supplied 23.8 per cent and fossil-fuelled generation provided 23.9 per cent. Purchases of power from interconnected utilities provided the remaining 4.8 per cent. In 1986, electric energy from nuclear generation, hydraulic generation and fossil-fuelled generation supplied 46.0 per cent, 29.4 per cent and 18.9 per cent, respectively, of the total energy to the system.

The 1987 fuel costs for coal, uranium, and oil amounted to $1,124 million, an increase of 20.5 per cent over 1986. This increase is primarily due to higher coal costs associated with the increased level of electricity generated by coal-fired stations. This increased coal-fired generation is mainly attributable to a decrease in the availability of lower cost hydraulic generation as a result of lower than normal precipitation. The increase in fuel costs is also due to a higher level of energy demand.

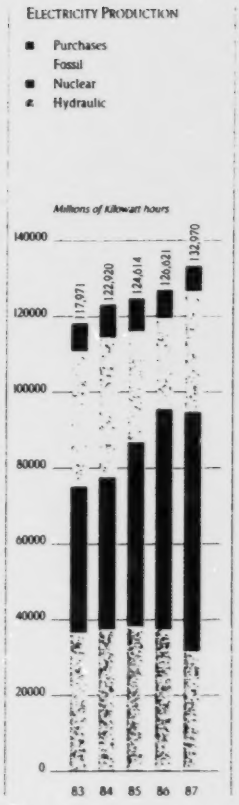
The payments Ontario Hydro makes primarily to the Province of Ontario for the use of provincial waters in its hydraulic plants amounted to $90 million in 1987, a decrease of $1 million over 1986. This reflects the effect of the decrease in hydraulic generation in 1987 compared with 1986, offset by the impact of the increase in water rental rates.

Electricity purchased from neighbouring utilities amounted to $117 million in 1987, a decrease of $11 million over 1986. These purchases are generally made during periods of peak demand or emergency situations so as to maintain a reliable supply of electricity.

In 1983, units 1 and 2 of the Pickering Nuclear Generating Station were taken out of operation to replace existing pressure tubes. Unit 1 has returned to operation in October 1987 and unit 2 is expected to return to operation in 1988. The maintenance and overhead costs during the shutdown period have been included in the payback calculation according to the Pickering Payback Agreement. As a result, Ontario Hydro was able to reduce its 1987 and 1986 operating costs by $23 million and $63 million respectively, which represents the amount to be offset against future amounts payable by Ontario Hydro to Atomic Energy of Canada Limited and the Province of Ontario, the other two parties to this agreement.

Operation, Maintenance and Administration

The costs associated with the operation, maintenance and administration of the Corporation in 1987 were $1,150 million, an increase of $136 million over 1986. This increase of 13.4 per cent is primarily related to placing new facilities in service, and cost escalation in labour and other costs. The in-service capacity of the generation system grew about 3 per cent or 837 megawatts in 1987, reflecting the addition of one nuclear generating unit. The transmission and distribution



system work-load also grew in 1987, as reflected in an increase of approximately 3 per cent in the number of customers and an increase of about 1 per cent in the kilometres of rural lines maintained. The chart shows the operation, maintenance and administration costs by major activity for the period 1983 through 1987.

Depreciation

The depreciation charged to operations totalled $723 million in 1987, $18 million or 2.6 per cent higher than in 1986. Contributing to this increase were the additional facilities placed in service, including Bruce unit 8, and the full year's impact of Pickering unit 8 and Bruce unit 7, partially offset by the effect of a lower provision for fuel channel removal costs in 1987. The decrease in this provision is due primarily to a reduction in the estimated fuel channel removal costs for Pickering units 1 and 2, which has now been substantially completed.

Financing Charges

Financing charges are comprised of interest and foreign exchange costs. Interest charged to operations represents the total cost of borrowing less interest capitalized. This is designed to effect a proper allocation of costs between current and future customers. Foreign exchange mainly represents the amortization of gains or losses on the principal amount of foreign debt.

Gross interest costs for 1987 amounted to $2,744 million, an increase of $60 million or 2.2 per cent as compared with 1986. The primary reason for this increase is related to the additional funds borrowed during the year to finance the construction of new generating stations which are needed to meet future demand. This increase was partially offset by the effect of a stronger Canadian dollar relative to the United States dollar on foreign currency interest payments, as well as the effect of refinancing debt that matured during the year at lower interest rates.

Interest charged to operations amounted to $1,702 million in 1987, $117 million or 7.4 per cent higher than in 1986. The increase resulted primarily from placing an additional nuclear generating unit in service in 1987, and the full year's impact of units placed in service in 1986. The in-service date is the time from which interest is no longer capitalized and is charged to operations.

Foreign exchange costs amounted to $126 million in 1987, a decrease of $87 million or 40.8 per cent over 1986. The primary factor contributing to the decrease in foreign exchange costs was the effect of the rise in value of the Canadian dollar relative to the United States dollar.

Net Income/Financial Indicators

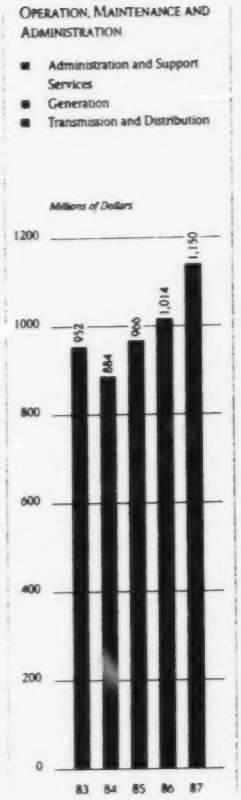
Ontario Hydro earned a net income of $271 million in 1987, compared with $247 million in 1986. Ontario Hydro's main financial indicators are the debt, cash flow coverage and interest coverage ratios. The debt ratio at the end of 1987 was .836 as compared to the 1986 ratio of .835. The cash flow coverage for 1987 was 1.08, the highest level since 1981. The level of interest coverage for 1987 and 1986 were 1.10 and 1.09 respectively. The financial position of the Corporation remains strong.

Capital Expenditures And Financing

Investment In Fixed Assets

Ontario Hydro invests in fixed assets to meet expected growth in the demand for electricity, to replace existing assets with facilities that are more economical, and to meet regulatory requirements. The total assets of the Corporation at the end of 1987 were $32,657 million and of this amount, about 86 per cent consists of fixed assets in service and under construction. This relatively high percentage reflects the capital-intensive nature of Ontario Hydro's business.

The investment in fixed assets during 1987 was $2,524 million. A major portion of the 1987 capital expenditures went toward the construction of new generating facilities. In addition, the 1987 capital expenditures reflect the continued emphasis being placed on investment in transmission and distribution facilities to improve the quality and reliability of service.



The expenditures on major capital projects under construction during 1987 and 1986 were:

	1987	1986
	millions of dollars	
Nuclear Generation		
Darlington	1,282	1,131
Bruce	145	279
Pickering	24	34
Generating Facilities	1,451	1,444
Transmission and Distribution	495	422

Ontario Hydro placed in service unit 8 at Bruce in May, 1987, at a total cost of $1,633 million, including $308 million for heavy water. In addition, two 500-kilovolt transmission lines in the northeastern and southeastern regions of the Province of Ontario were placed in service in 1987 at a total cost of $129 million.

There has been a modest decline in the annual investment in fixed assets from $2,746 million in 1983 to $2,524 million in 1987, as the major generating projects are completed. The expenditures for investment in fixed assets for the period 1983 through 1987 are shown in the chart.

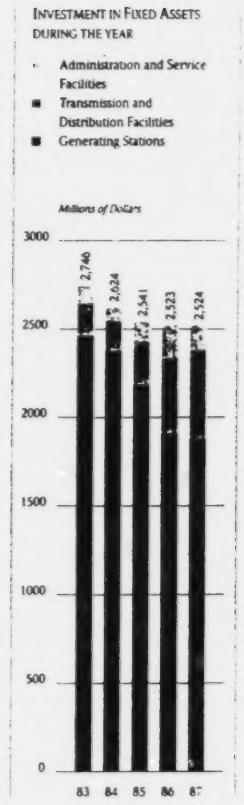
Financing

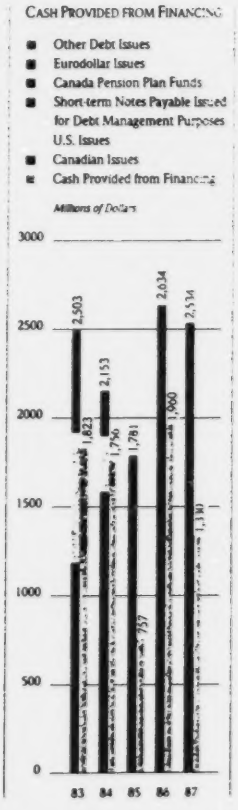
Cash required by Ontario Hydro to finance the investment in fixed assets is provided from two major sources: cash provided from operations and cash from external borrowings. For 1987, cash provided from operations and cash from financing were $1,204 million and $1,330 million respectively. Cash from borrowings represents the amount of cash provided from the issuance of long-term debt and the increase in the level of short-term notes payable issued for debt management purposes, less the amount of cash used to retire long-term debt.

The proceeds from the issue of bonds sold to the public by Ontario Hydro during 1987 amounted to $1,585 million, and the proceeds from the issue of bonds to the Province of Ontario with respect to Canada Pension Plan funds provided a further $302 million. These proceeds were from eight Canadian issues with an average coupon interest rate of 9.6 per cent for an average term of 8.0 years. For the same period in 1986, the average coupon interest rate and the average term of new debt issued were 9.2 per cent and 8.1 years respectively. In addition, proceeds of $397 million were received from the issuance of long-term notes. Ontario Hydro also issues floating rate short-term notes, with terms to maturity of less than one year, as part of its debt management activities. In 1987, the level of short-term notes payable issued for debt management purposes increased by $250 million.

Cash provided from financing from 1983 through 1987 is shown in the chart. The principal markets Ontario Hydro has operated in are the Canadian, United States, and Eurodollar public markets. Financing activities for 1987, were met entirely from the Canadian market and from Canada Pension Plan funds to minimize foreign exchange exposure.

Cash amounting to $1,096 million was used to retire maturing long-term debt in 1987, compared with $321 million in 1986. In addition, during 1987, cash amounting to $108 million was used to redeem debt prior to maturity, compared with $353 million in 1986.





The accompanying financial statements have been prepared in accordance with accounting principles generally accepted in Canada. Such principles, except for the change in the accounting policy for pension costs as described under "Pension plan" and in note 14 to the financial statements, have been applied on a basis consistent with that of the preceding year. The significant accounting policies followed by Ontario Hydro are described below.

Rate setting

Ontario Hydro has broad powers to generate, supply and deliver electric power throughout the Province of Ontario. The Corporation operates under the Power Corporation Act and is subject to provisions of the Ontario Energy Board Act.

Under the provisions of the Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies. The debt retirement appropriation is the amount required under the Act to accumulate on a sinking fund basis over 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for, or withdrawal from, the stabilization of rates and contingencies reserve is an amount established to maintain a sound financial position and to stabilize the effect of cost fluctuations.

Under the provisions of the Ontario Energy Board Act, a public hearing before the Ontario Energy Board is required in respect of any changes in electricity rates proposed by Ontario Hydro which affect its municipal utilities, direct industrial customers, or, if the Minister of Energy so directs, rural retail customers. The Ontario Energy Board submits its recommendations to the Minister of Energy. After considering the recommendations of the Ontario Energy Board, the Board of Directors of Ontario Hydro, under the authority of the Power Corporation Act, establishes the electricity rates to be charged to customers.

If the Board of Directors specifies a certain cost or gain is to be included in future electricity rates that, in accordance with the accounting policies summarized below, would be charged or credited to operations in the current year, then this cost or gain is deferred and amortized to future operations on a basis consistent with its inclusion in rates.

Fixed assets

Fixed assets in service include operating facilities and non-operating reserve facilities. Construction in progress includes fixed assets under construction and heavy water held for use in nuclear generating stations under construction.

Fixed assets are capitalized at cost which comprises material, labour, engineering costs, and the costs of training initial operating staff for new facilities as well as overheads, depreciation on service equipment, and interest applicable to capital construction activities. In the case of generation facilities, the cost also includes the net cost of commissioning, and for nuclear generation, the cost of heavy water. The net cost of commissioning is the cost of start-up less the value attributed to energy produced by generation facilities during their commissioning period. The cost of heavy water comprises the direct cost of production and applicable overheads, as well as interest and depreciation on the heavy water production facilities and the estimated removal costs of these facilities. For multi-unit facilities, a proportionate share of the cost of common facilities is placed in service with each major operating unit. Leases which transfer the benefits and risks of ownership of assets to Ontario Hydro are capitalized.

Interest is capitalized on construction in progress at rates (1987 – 11.4 per cent, 1986 – 12.9 per cent) which approximate the average cost of long-term funds borrowed in the years in which expenditures have been made for fixed assets under construction. If the construction period of a project is extended and the construction activities are continued, interest is capitalized during the period of extension provided that the project has a reasonable expectation of being completed.

If a project is cancelled or deferred indefinitely with a low probability of construction being resumed, all costs including the costs of cancellation are written off to operations.

If fixed assets are removed from operations and mothballed for future use, termed non-operating reserve facilities, the costs of mothballing are charged to operations.

Depreciation

The capital costs of fixed assets in service are depreciated on a straight-line basis. Depreciation rates for the various classes of assets are based on their estimated service lives. Major components of generating stations are depreciated over the lesser of the service life expectancy of the component or the remaining service life of the associated generating station.

The estimated service lives of assets in the major classes are:

Generating stations – hydraulic	– 65 to 100 years
– fossil	– 30 to 35 years
– nuclear	– 40 years
Heavy water	– over the period ending in the year 2040
Transmission and distribution facilities	– 20 to 55 years
Heavy water production facilities	– 20 years
Administration and service facilities	– 5 to 60 years

In accordance with group depreciation practices, for normal retirements the cost of fixed assets retired is charged to accumulated depreciation with no gain or loss being reflected in operations. However, gains and losses on sales of fixed assets, and losses on premature retirements are charged to operations in the year incurred as adjustments to depreciation expense.

When the costs of removal less residual value, termed removal costs, on retirements of fixed assets can be reasonably estimated and are significant, provisions for these costs, except for those related to heavy water production facilities, are charged to depreciation expense on an annuity basis over the remaining service life of the related fixed assets. For heavy water production facilities, provisions for removal costs are charged to heavy water production costs on a straight-line basis over the remaining service life of the related facilities. Other removal costs are charged to depreciation expense as incurred. Removal costs include the estimated costs of decommissioning nuclear stations and heavy water production facilities, and the estimated costs of removing certain nuclear reactor fuel channels.

The estimated service lives of fixed assets and the significant assumptions underlying the estimates of fixed asset removal costs are subject to periodic review. Any changes arising out of such a review are implemented on a remaining service life basis from the year the changes can be first reflected in electricity rates.

Non-operating reserve facilities are amortized so that any estimated loss in value is charged to depreciation expense on a straight-line basis over their expected non-operating period.

Unamortized advances for fuel supplies

As part of its program to ensure the adequate supply of fuels for its generating stations, Ontario Hydro has entered into long-term fuel supply contracts. Where these contracts require Ontario Hydro to make payments for pre-production costs to suppliers in advance of the fuel delivery, these payments and associated costs, including interest, are carried in the accounts as unamortized advances for fuel supplies. The advances are amortized to fuel inventory as the fuels are delivered.

Fuel for electric generation

Fuel used for electric generation comprises the average inventory costs of fuel consumed, charges for commissioning energy produced, and provisions for disposal of nuclear fuel irradiated during the period. The inventory cost of fuel consumed comprises fuel purchases, transportation and handling costs, and the amortization of advances for fuel supplies. Transportation costs include charges for interest and depreciation on railway equipment owned by Ontario Hydro. The charges for commissioning energy produced during the period represent the incremental operating and fuel costs of producing the same quantity of energy at generating units displaced because of the commissioning activity. The costs for disposal of nuclear fuel irradiated in each period are charged to operations based on estimated future expenditures and interest accumulating to the estimated date of disposal. Estimates of expenditures, interest and escalation rates, and the date of disposal are subject to periodic review. Adjustments resulting from changes in estimates are charged to operations on an annuity basis over the period from the year the changes can be first reflected in electricity rates to the estimated in-service date of the disposal facility.

Foreign currency translation

Current monetary assets and liabilities in foreign currencies are translated to Canadian currency at year-end rates of exchange and the resultant exchange gains or losses are credited or charged to operations. Long-term debt payable in foreign currencies is translated to Canadian currency at year-end rates of exchange. Resulting unrealized exchange gains or losses are deferred and included in unamortized debt costs, and are amortized to operations on an annuity basis over the remaining life of the related debt.

Foreign exchange gains or losses on hedges of long-term debt payable in foreign currencies are deferred and included in unamortized debt costs. The deferred gains or losses related to principal payments are amortized to operations on an annuity basis over the remaining period through to the year in which the hedged principal payments are due. The deferred gains or losses related to interest payments are credited or charged to operations in the year in which the hedged interest payments are due.

Foreign exchange gains or losses on early redemption of long-term debt are deferred and included in unamortized debt costs if the exposure in the foreign currency related to the redeemed debt is not reduced as a result of the refinancing of the redeemed debt in the same currency. These deferred gains or losses are amortized on an annuity basis over the period to the original maturity date of the redeemed debt. If the foreign currency exposure is reduced as a result of the early redemption of debt, the resulting foreign exchange gains or losses related to the redeemed debt are credited or charged to operations.

Unamortized debt costs

Unamortized debt costs include the unamortized amounts related to unrealized foreign exchange gains or losses resulting from the translation of foreign currency long-term debt, foreign exchange gains or losses on hedges, foreign exchange gains or losses on the early redemption of long-term debt, discounts or premiums arising from the issuance of debt or the acquisition of debt prior to maturity, and discounts or premiums accrued on foreign currency hedges.

Debt discounts or premiums arising from the issuance of debt are amortized over the period to maturity of the debt. Discounts or premiums on debt acquired prior to the date of maturity are amortized over the period from the acquisition date to the original maturity date of the debt. Discounts or premiums on foreign currency hedges are credited or charged to operations over the terms of the individual hedges.

Nuclear agreement – Pickering units 1 and 2

Ontario Hydro, Atomic Energy of Canada Limited and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amounted to $258 million and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Ontario Hydro is required to make monthly payments until the year 2003 to each of the parties in proportion to their capital contributions. These payments, termed "payback", represent in a broad sense the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

Pension plan

The pension plan is a contributory, defined benefit plan covering all regular employees of Ontario Hydro. Ontario Hydro is responsible for all deficiencies and surpluses in the pension plan.

Effective January 1, 1987, Ontario Hydro implemented the new recommendations of the Canadian Institute of Chartered Accountants with respect to pension costs and obligations. Accordingly, pension costs for accounting purposes are actuarially determined based on the assumptions that reflect management's best estimate of the effect of future events on the actuarial present value of accrued pension benefits, and the valuation of pension plan assets using a five-year market value average. Pension plan surpluses and deficiencies are amortized on an annuity basis over the expected average remaining period of service of the employees covered by Ontario Hydro's pension plan.

Prior to January 1, 1987, pension costs were actuarially determined based on assumptions used for funding purposes. Any net unfunded liability arising from past service obligations was amortized up to fifteen years. All other net unfunded liabilities or net surpluses were amortized up to five years.

Research and development

Research and development costs are charged to operations in the year incurred, except for those related directly to the design or construction of a specific capital facility which are capitalized as part of the facility.

Management's Responsibility For Financial Reporting

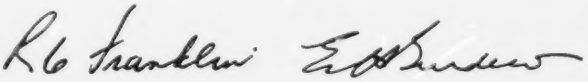
The accompanying financial statements of Ontario Hydro are the responsibility of management and have been prepared in accordance with accounting principles generally accepted in Canada. Such principles, except for the change in the accounting policy for pension costs as described in the accompanying Summary of Significant Accounting Policies and in note 14 to the financial statements, have been applied on a basis consistent with that of the preceding year. The significant accounting policies followed by Ontario Hydro are described in the Summary of Significant Accounting Policies. The preparation of financial statements necessarily involves the use of estimates based on management's judgement, particularly when transactions affecting the current accounting period cannot be finalized with certainty until future periods. The financial statements have been properly prepared within reasonable limits of materiality and in light of information available up to March 14, 1988. The information presented elsewhere in the Annual Report is consistent with that in the financial statements.

Management maintains a system of internal controls designed to provide reasonable assurance that the assets are safeguarded and that reliable financial information is available on a timely basis. The system includes formal policies and procedures and an organizational structure that provides for appropriate delegation of authority and segregation of responsibilities. An internal audit function independently evaluates the effectiveness of these internal controls on an ongoing basis and reports its findings to management and to the Audit Committee of the Board of Directors.

The financial statements have been examined by Clarkson Gordon, independent external auditors appointed by the Lieutenant Governor in Council of Ontario. The external auditors' responsibility is to express their opinion on whether the financial statements are fairly presented in accordance with generally accepted accounting principles. The Auditors' Report, which appears below, outlines the scope of their examination and their opinion.

The Board of Directors, through the Audit Committee, is responsible for ensuring that management fulfills its responsibilities for financial reporting and internal controls. The Audit Committee meets periodically with management, the internal auditors and the external auditors to satisfy itself that each group has properly discharged its respective responsibility, and to review the financial statements before recommending approval by the Board of Directors. The external auditors have direct and full access to the Audit Committee, with and without the presence of management, to discuss their audit and their findings as to the integrity of Ontario Hydro's financial reporting and the effectiveness of the system of internal controls.

On behalf of Management



Chairman and President

Executive Vice-President, Finance and Planning

Toronto, Canada,
March 14, 1988.

Auditors' Report

To the Board of Directors of Ontario Hydro:

We have examined the statement of financial position of Ontario Hydro as at December 31, 1987 and the statements of operations, equities accumulated through debt retirement appropriations, reserve for stabilization of rates and contingencies and source of cash used for investment in fixed assets for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1987 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles. Further, in our opinion, such principles, except for the change in the accounting policy for pension costs as described in the Summary of Significant Accounting Policies and in note 14 to the financial statements, have been applied on a basis consistent with that of the preceding year.

Toronto, Canada,
March 14, 1988.

Clarkson Gordon
Chartered Accountants

for the year ended December 31, 1987	1987	1986
	millions of dollars	
Revenues		
Primary power and energy		
Municipal utilities	3,441	3,116
Rural retail customers	968	885
Direct industrial customers	675	604
	5,084	4,605
Secondary power and energy (note 1)	196	248
	5,280	4,853
Costs		
Operation, maintenance and administration	1,150	1,014
Fuel used for electric generation	1,124	933
Water rentals (note 2)	90	91
Power purchased	117	128
Nuclear agreement – payback (note 3)	(23)	(63)
Depreciation (note 4)	723	705
	3,181	2,808
Income before financing charges	2,099	2,045
Interest (note 5)	1,702	1,585
Foreign exchange (note 6)	126	213
	1,828	1,798
Net income	271	247
Appropriation for (withdrawal from):		
Debt retirement	319	292
Stabilization of rates and contingencies	(48)	(45)
	271	247

See accompanying summary of significant accounting policies and notes to financial statements.

as at December 31, 1987	1987	1986
		millions of dollars
Assets		
Fixed assets (note 7)		
Fixed assets in service	25,788	23,312
Less accumulated depreciation	5,581	4,946
	20,207	18,366
Construction in progress	7,779	7,737
	27,986	26,103
Current assets		
Cash and temporary investments	215	285
Accounts receivable	584	543
Fuel for electric generation (note 8)	1,039	1,065
Materials and supplies, at cost	287	281
	2,125	2,174
Other assets		
Unamortized debt costs	940	1,597
Unamortized advances for fuel supplies (note 9)	777	884
Unamortized deferred costs (note 10)	473	283
Long-term accounts receivable and other assets	356	316
	2,546	3,080
	32,657	31,357

See accompanying summary of significant accounting policies and notes to financial statements.

	1987	1986
	millions of dollars	
Liabilities		
Long-term debt (note 11)	23,862	23,494
Current liabilities		
Accounts payable and accrued charges	624	473
Short-term notes payable	502	255
Accrued interest	705	742
Long-term debt payable within one year	1,202	1,076
	3,033	2,546
Other liabilities		
Long-term accounts payable and accrued charges	183	136
Accrued fixed asset removal and irradiated fuel disposal costs (note 12)	617	490
	800	626
Contingencies (notes 9, 10 and 14)		
Equity		
Equities accumulated through debt retirement appropriations	3,229	2,910
Reserve for stabilization of rates and contingencies	1,606	1,654
Contributions from the Province of Ontario as assistance for rural construction	127	127
	4,962	4,691
	32,657	31,357

On behalf of the Board

R6 Franklin

Chairman and President

Vice-Chairman

Toronto, Canada,
March 14, 1988.

Statement of Equities Accumulated Through Debt Retirement Appropriations

for the year ended December 31, 1987	*Municipal Utilities*	*Power District (Rural Retail and Direct Industrial Customers)*	*Totals* 1987	1986
		millions of dollars		
Balances at beginning of year	2,027	883	2,910	2,618
Appropriation	218	101	319	292
Balances at end of year	2,245	984	3,229	2,910

Statement of Reserve for Stabilization of Rates and Contingencies

for the year ended December 31, 1987	*Held for the benefit of all customers*	*Held for the benefit of (or recoverable from) certain groups of customers*		*Totals*	
		Municipal Utilities	*Rural Retail Customers*	*Direct Industrial Customers*	1987	1986
			millions of dollars			
Balances at beginning of year	1,704	1	(41)	(10)	1,654	1,699
Appropriation (withdrawal)	(51)	—	5	(2)	(48)	(45)
Balances at end of year	1,653	1	(36)	(12)	1,606	1,654

See accompanying summary of significant accounting policies and notes to financial statements.

STATEMENT OF SOURCE OF CASH USED FOR INVESTMENTS IN FIXED ASSETS

for the year ended December 31, 1987

	1987	1986
	millions of dollars	
Cash provided from operations (note 13)	1,204	1,040
Cash provided from financing		
Long-term debt issued	2,284	2,384
Change in short-term notes payable issued for debt management purposes – increase	250	250
	2,534	2,634
Less long-term debt retired	1,204	674
Cash provided from financing	1,330	1,960
Cash (used for) provided from investment in other assets (note 13)	(149)	70
Cash provided from operations, financing and other activities	2,385	3,070
Changes in cash and cash equivalents – decrease (increase) (note 13)	67	(485)
Cash used for investment in fixed assets	2,452	2,585
Changes in accounts payable and accrued charges affecting investment in fixed assets – increase (decrease)	72	(62)
Investment in fixed assets (note 13)	2,524	2,523

See accompanying summary of significant accounting policies and notes to financial statements.

1. Secondary power and energy

Secondary power and energy revenues include $194 million (1986 – $247 million) from sales of electricity to United States utilities.

2. Water rentals

Water rentals are the amounts paid primarily to the Province of Ontario for the use of water for hydraulic generation.

3. Nuclear agreement – payback

In 1987, the Nuclear Agreement, which is described in the Summary of Significant Accounting Policies, was amended by the parties to the agreement to reflect the settlement in principle reached in 1986. The amendment to the agreement confirms Ontario Hydro's interpretation that the negative payback amounts accumulated during the 1983 through 1988 shutdown period for replacement of pressure tubes in Pickering Nuclear Generating Station units 1 and 2 can be offset against future positive payback amounts payable to Atomic Energy of Canada Limited and the Province of Ontario after the units return to operation. The negative payback amounts, totalling $205 million as of December 31, 1987, have been credited against the costs of operations for the period 1983 through 1987, and are included in "long-term accounts receivable and other assets". The amendment establishes that the negative payback amounts accumulated during the shutdown period of these units, plus interest, are to be recovered by Ontario Hydro over the remaining term of the agreement, commencing with the return to operation of the last of the two units. Pickering unit 1 returned to operation in 1987 and unit 2 is expected to return to operation in 1988.

4. Depreciation

	1987	1986
	millions of dollars	
Depreciation of fixed assets in service	717	638
Amortization of deferred costs	40	41
Fixed asset removal costs		
– provision for fuel channel removal costs	35	83
– provision for decommissioning costs	17	23
– other removal costs	14	15
	823	800
Less:		
Depreciation charged to – heavy water production	51	51
– construction in progress	38	33
– fuel for electric generation	2	2
Net gain on sales of fixed assets	9	9
	100	95
	723	705

5. Interest

	1987	1986
	millions of dollars	
Interest on bonds, notes, and other debt	2,694	2,650
Interest on accrued fixed asset removal and irradiated fuel disposal costs	50	34
	2,744	2,684
Less:		
Interest charged to – construction in progress	772	807
– heavy water production	98	112
– fuel for electric generation	108	102
– unamortized advances for fuel supplies	–	17
Interest earned on investments	64	61
	1,042	1,099
	1,702	1,585

6. Foreign exchange

	1987	1986
	millions of dollars	
Amortization of foreign exchange gains and losses	93	189
Net exchange loss on other foreign transactions	33	24
	126	213

7. Fixed assets

	1987		
	Assets in Service	Accumulated Depreciation	Construction in Progress
		millions of dollars	
Generating stations – hydraulic	1,863	599	41
– fossil	3,618	1,338	47
– nuclear	10,450	1,188	6,162
Heavy water	2,432	210	949
Transmission and distribution	5,130	1,388	516
Heavy water production facilities	1,128	393	–
Administration and service facilities	1,167	465	64
	25,788	5,581	7,779

	1986		
	Assets in Service	Accumulated Depreciation	Construction in Progress
		millions of dollars	
Generating stations – hydraulic	1,844	572	26
– fossil	3,610	1,232	24
– nuclear	8,823	942	6,188
Heavy water	2,117	171	997
Transmission and distribution	4,748	1,283	425
Heavy water production facilities	1,128	339	–
Administration and service facilities	1,042	407	77
	23,312	4,946	7,737

Fossil generating stations in service include non-operating reserve facilities. As at December 31, 1987, the capital cost and accumulated depreciation of these non-operating fossil-fuelled facilities amounted to $488 million and $352 million, respectively (1986 – $785 million and $448 million, respectively). Substantially all of the undepreciated cost of these facilities is related to the two units (1986 – four units) at the Lennox generating station which, based on current forecasts, are expected to return to operation by the mid-1990s. In 1987, two units at Lennox returned to operation.

7. Fixed assets (continued)

Construction in progress at December 31, 1987:

	Remaining Number of Units Scheduled	*Planned In-Service Dates*	*Dependable Capacity to be Placed in Service*	*Costs Incurred to December 31, 1987*	*Estimated Cost to Complete*
			megawatts	*millions of dollars*	
Darlington Nuclear Generating Station (including heavy water)	4	1989-92	3,524	6,766	4,632
All other construction in progress	–	–	–	1,013	–
				7,779	

Estimated cost to complete is the most recent projection and includes cost escalation and interest amounting to approximately $2,558 million. Cost escalation and interest are forecast to average 6% and 11% per year, respectively, over the period 1988 to 1992. Because of the uncertainties associated with long construction lead times and planned in-service dates, this estimated cost to complete is subject to change.

The fuel channel replacement program for Pickering Nuclear Generating Station units 1 and 2 is estimated to cost $457 million. Of this total, $332 million is to be capitalized as installation costs, and the remaining $125 million is related to the removal costs of the existing pressure tubes and is being recovered through charges to operations. As of December 31, 1987, the actual expenditures for installation costs, including interest of $81 million, totalled $303 million, and the actual expenditures for fuel channel removal costs totalled $120 million. Pickering unit 1 returned to operation in 1987 and unit 2 is expected to return to operation in 1988.

8. Fuel for electric generation

	1987	1986
	millions of dollars	
Inventories – uranium	643	586
– coal	381	479
– oil	15	–
	1,039	1,065

9. Unamortized advances for fuel supplies

	1987	1986
	millions of dollars	
Uranium – Rio Algom Limited	422	431
– Denison Mines Limited	345	359
	767	790
Coal	10	94
	777	884

Unamortized advances for fuel supplies are recovered as fuel is delivered. Over the next five years, the amortization of advances for uranium supplies will be approximately $23 million for the contract with Rio Algom Limited and approximately $62 million for Denison Mines Limited.

Ontario Hydro has entered into long-term contracts with Denison Mines Limited and Rio Algom Limited for uranium supplies through to 2012 and 2027, respectively. Ontario Hydro's current forecast of the annual requirements for uranium is approximately 1,200 megagrams for 1988, increasing to approximately 1,700 megagrams by 1994. The uranium inventory as at December 31, 1987 plus the contracted deliveries through to 1994 exceed the forecasted requirements up to 1994 by approximately 300 megagrams. Commencing in 1994 through to 2012, contracted deliveries exceed forecasted requirements of the nuclear generating facilities currently in service and under construction by approximately 1,000 megagrams per year. Ontario Hydro's options for managing the oversupply include resale of the uranium and, under specified conditions, cancellation or renegotiation of the contracts. In the event that a contract is cancelled, the supplier is not required to refund any outstanding advances. At this time, the likelihood of a contract cancellation and the financial implications of pursuing the options are not determinable.

On November 17, 1987, Ontario Hydro provided USX Corporation with notification of cancellation of the Coal Purchase Agreement pursuant to the three year notice period provision in the Agreement as described in note 10. As a consequence, $85 million of the unamortized advances for coal supply was transferred to "Unamortized deferred costs" as at December 31, 1987.

10. Unamortized deferred costs	1987	1986
	millions of dollars	
Bruce Heavy Water Plant "D"	222	259
Wesleyville Generating Station	20	24
	242	283
Fuel oil contract	146	–
Coal Purchase Agreement	85	–
	473	283

Bruce Heavy Water Plant "D" is an indefinitely deferred project with a low probability of construction being resumed. The capital cost of this project and the unamortized deferred costs associated with the cancelled Wesleyville generating station project were not written off directly to operations since the Board of Directors under its rate setting authority determined that these costs be amortized for recovery through electricity rates over the period 1984 through 1993, which results in an annual charge of $40 million in 1987.

On September 18, 1987, Ontario Hydro and Petrosar Limited reached a settlement with respect to the fuel oil contract. Under the terms of the settlement, Ontario Hydro paid $150 million to Petrosar Limited, and the parties released each other from all obligations and claims related to the contract. The amount of this payment, less a provision of approximately $4 million which was charged to operations in prior years, was not charged directly to operations since the Board of Directors under its rate setting authority determined that this cost be deferred and amortized for recovery through electricity rates on a straight-line basis over the period from 1988, the first year such cost can be reflected in rates, through 1992. Accordingly, no amount was charged to operations in 1987.

In 1974, Ontario Hydro entered into a Coal Purchase Agreement (the "Agreement") with USX Corporation (formerly, United States Steel Corporation) to develop and operate the Cumberland Mine so as to produce coal for Ontario Hydro through to approximately 2015. An economic analysis based on performance of the Cumberland Mine to date and projection of future costs has determined that the reduced costs associated with future coal purchases from alternative sources will more than offset costs of cancelling the Agreement. Accordingly, on November 17, 1987, Ontario Hydro provided USX Corporation with notification of cancellation of the Agreement pursuant to the three year notice period provision in the Agreement. If USX Corporation decides not to continue operating the Cumberland Mine after cancellation of the Agreement, Ontario Hydro is liable for certain lease obligations and mine shutdown costs. At this time, the likelihood of USX Corporation deciding not to continue operating the mine is not determinable. Furthermore, the amount of such costs in the event of discontinued operation of the mine are subject to negotiation. Accordingly, no provision for such costs has been reflected in the financial statements. Under the Agreement, Ontario Hydro has made payments for pre-production costs to USX Corporation in advance of the coal deliveries. On cancellation of the Agreement, USX Corporation is not required to refund any outstanding advances. The outstanding advances and associated costs as at the date of cancellation of the Agreement are estimated to be approximately $85 million. This amount, which was included in "Unamortized advances for fuel supplies" (see note 9), was not charged directly to operations since the Board of Directors under its rate setting authority determined that this cost be deferred and amortized for recovery through electricity rates on a straight-line basis over the period from 1989, the first year such cost can be reflected in rates, through 1993. Accordingly, no amount was charged to operations in 1987.

11. Long-term debt

	1987	1986
	millions of dollars	
Bonds and notes payable	24,910	24,390
Other long-term debt	154	180
	25,064	24,570
Less payable within one year	1,202	1,076
	23,862	23,494

Bonds and notes payable:

Bonds and notes payable, expressed in Canadian dollars, are summarized by years of maturity and by the currency in which they are payable in the following table:

	1987				1986	
Years of Maturity	*Principal Outstanding*			*Weighted Average Coupon Rate*	*Principal Outstanding*	*Weighted Average Coupon Rate*
	Canadian	*Foreign*	*Total*	*per cent*	*Total*	*per cent*
	millions of dollars				*millions of dollars*	
1987	–	–	–		1,054	
1988	864	318	1,182		1,189	
1989	924	772	1,696		1,335	
1990	1,031	698	1,729		1,770	
1991	1,144	887	2,031		2,090	
1992	997	1,010	2,007		–	
1- 5 years	4,960	3,685	8,645	11.5	7,438	11.7
6-10 years	4,143	1,057	5,200	10.3	5,469	10.8
11-15 years	2,620	646	3,266	11.6	3,035	10.9
16-20 years	1,901	1,574	3,475	9.9	3,354	10.5
21-25 years	1,782	2,291	4,073	11.8	4,456	11.0
26-30 years	–	251	251	12.0	638	14.4
	15,406	9,504	24,910	11.1	24,390	11.2

Currency in which payable:		
Canadian dollars	15,406	13,926
United States dollars	9,483	10,355
United Kingdom pounds sterling	21	23
Swiss francs	–	86
	24,910	24,390

Ontario Hydro has entered into financial arrangements to hedge a portion of the foreign currency exposure related to principal and interest payments with respect to long-term debt and these arrangements are primarily in short-term forward exchange contracts. These contracts amounted to United States $641 million and United Kingdom pounds sterling 10 million as at December 31, 1987 (1986 – United States $744 million and Swiss francs 106 million), having a weighted average Canadian dollar exchange rate of 1.34 and 2.31 respectively (1986 – 1.39 and 0.87 respectively). These financial arrangements hedge principal and interest payments amounting to United States $335 million and United Kingdom pounds sterling 4 million due in 1988 and the remaining United States $306 million and United Kingdom pounds sterling 6 million hedge principal and interest payments due over the period 1989 through 1996.

Bonds and notes payable in United States dollars include Canadian $6,614 million (1986 – Canadian $7,083 million) of Ontario Hydro bonds held by the Province of Ontario and having terms identical with Province of Ontario issues sold in the United States on behalf of Ontario Hydro. Bonds and notes payable are either held, or guaranteed as to principal and interest, by the Province of Ontario.

Ontario Hydro has entered into interest rate swap arrangements amounting to Canadian $1,000 million in notional principal as at December 31, 1987 (1986 – Canadian $350 million), and expiring in 1989 through 1993. These arrangements have effectively converted fixed interest rates on long-term debt, having a weighted average coupon rate of 9.9% (1986 – 9.8%), to variable interest rates which are adjusted quarterly to the prevailing Canadian bankers' acceptance rate.

11. Long-term debt (continued)

Other long-term debt:	Years of Maturity	Interest Rate	1987	1986
		per cent	*millions of dollars*	
Balance due to Atomic Energy of Canada Limited on purchase of Bruce Heavy Water Plant "A"	1992	7.8	104	121
Capitalized lease obligation for the Head Office building, payable in U.S. dollars	2005	8.0	47	52
Capitalized lease obligations for transport and service equipment	1988 to 1994	6.3 to 11.9	3	7
			154	180

Payments required on the above debt, excluding interest, will total $114 million over the next five years. The amount payable within one year is $20 million (1986 – $22 million).

12. Accrued fixed asset removal and irradiated fuel disposal costs

	1987	1986
	millions of dollars	
Accrued fixed asset removal costs		
– accrued decommissioning costs	162	132
– accrued fuel channel removal costs	149	115
	311	247
Accrued irradiated fuel disposal costs	306	243
	617	490

Fixed asset removal costs:

Fixed asset removal costs are the costs of removing certain fuel channels from nuclear reactors which are expected to be replaced during the life of the reactors, and the costs of decommissioning nuclear generating stations and heavy water production facilities after the end of their service lives. The significant assumptions used in estimating fixed asset removal costs were:

- removal of fuel channels in Pickering Nuclear Generating Station "A" units 1 and 2 in the 1984 to 1987 period and units 3 and 4 in the 2000 to 2003 period, Bruce Nuclear Generating Station "A" in the 2002 to 2010 period, Pickering "B" in the 2012 to 2018 period, and Bruce "B" in the 2013 to 2019 period;
- decommissioning of nuclear generating stations in the 2041 to 2062 period on the deferred dismantlement basis (dismantlement following storage with surveillance for a 30-year period after shutdown of the reactors), and a transportation distance of 1,000 kilometres from nuclear generating facilities to disposal facilities;
- dismantlement of Bruce Heavy Water Plants "A", "B" and "D" in the 1991 to 2005 period;
- interest rates through to 2062 ranging from 9% to 10% (1986 – 9% to 12%); and
- escalation rates through to 2062 ranging from 4% to 8% (1986 – 5% to 8%).

Because of possible changes to the above factors and the methods used for decommissioning and fuel channel removal, these costs are subject to revision. The results of recent tests on a sample of pressure tubes in Pickering units 3 and 4 revealed a trend towards higher than expected build up of deuterium levels which, together with other technical considerations, could reduce the service lives of the pressure tubes in these units. On March 14, 1988, the Board of Directors decided to advance the retubing of Pickering units 3 and 4 to commence in 1989 and 1991, respectively. The financial impact on the provision for fuel channel removal costs of the change in the timing of the retubing of these units will not be included in operating costs until such change can be implemented on a remaining service life basis from 1989, the first year the change can be reflected in electricity rates, through 1993. The costs of removing the pressure tubes in these units are estimated to be approximately $144 million, and as of December 31, 1987, the accrued fuel channel removal costs related to these units totalled $61 million.

Irradiated fuel disposal costs:

The significant assumptions used in estimating the future irradiated fuel disposal costs were:

- an in-service date of the year 2010 for irradiated nuclear fuel disposal facilities;
- a transportation distance of 1,000 kilometres from nuclear generating facilities to disposal facilities;
- interest rates through to the disposal date ranging from 9% to 10% (1986 – 9% to 12%); and
- escalation rates through to the disposal date ranging from 4% to 7% (1986 – 5% to 9%).

Because of the uncertainties associated with the technology of disposal, and the above factors, these costs are subject to change.

13. Statement of Source of Cash Used for Investment in Fixed Assets

The Statement of Source of Cash Used for Investment in Fixed Assets reports the investment in fixed assets resulting from the cash flows from operations, financing and other activities, and the effects of changes in cash and cash equivalents and changes in accounts payable and accrued charges affecting investment in fixed assets during the year. This statement focuses on the investment in fixed assets in view of Ontario Hydro's current level of construction activities which are financed from two major sources, cash provided from operations and cash from financing. Cash from financing represents the amount of cash provided from the issuance of long-term debt and the increase in the level of short-term notes payable issued for debt management purposes, less the amount of cash used to retire long-term debt.

The components of cash provided from operations, investment in other assets, and changes in cash and cash equivalents, defined to be cash and temporary investments net of short-term notes payable issued for cash management purposes, are summarized below.

Cash provided from operations:	1987	1986
	millions of dollars	
Net Income	271	247
Items not requiring cash in the current year		
Depreciation	723	705
Amortization of foreign exchange gains and losses	93	189
Provision for irradiated fuel disposal costs	36	35
Nuclear agreement – payback	(23)	(63)
Other	37	16
Funds provided from operations	1,137	1,129
Changes in working capital, excluding cash and cash equivalents, and long-term accounts payable affecting operations – decrease (increase)	67	(89)
Cash provided from operations	1,204	1,040

Cash (used for) provided from investment in other assets:	1987	1986
	millions of dollars	
Advances and related costs for fuel supplies	(11)	(32)
Less repayments and amortization of advances for fuel supplies	35	49
	24	17
Payment related to fuel oil contract settlement (see note 10)	(150)	–
Other	(23)	53
Cash (used for) provided from investment in other assets	(149)	70

Changes in cash and cash equivalents:	1987	1986
	millions of dollars	
Cash and temporary investments – decrease (increase)	70	(267)
Short-term notes payable issued for cash management purposes – (decrease)	(3)	(218)
Changes in cash and cash equivalents – decrease (increase)	67	(485)

13. Statement of Source of Cash Used for Investment in Fixed Assets (continued)

The reconciliation of the change in fixed assets during the year with the investment in fixed assets for the year is summarized below:

	1987	1986
	millions of dollars	
Change in fixed assets	1,883	1,954
Depreciation of fixed assets in service	717	638
Less depreciation charged to heavy water production and construction in progress	(89)	(84)
	628	554
Net book value of fixed assets sold or retired	13	15
Investment in fixed assets	2,524	2,523

14. Pension and Insurance Plans

Ontario Hydro's employee benefit programs include pension and insurance plans. The assets of the pension, group life insurance and long-term disability plans and the changes in assets during the year are shown in the financial statements of The Pension and Insurance Fund, and are not included in Ontario Hydro's financial statements.

Pension Plan:

The change in the accounting policy for pension costs, as described in the Summary of Significant Accounting Policies under "Pension plan", was implemented, on a prospective basis, effective January 1, 1987. The effect of this change has been to increase pension costs for the year ended December 31, 1987 by approximately $13 million.

The most recent actuarial valuation for accounting purposes of Ontario Hydro's pension plan was performed as at December 31, 1986, using management's best estimate of the following significant assumptions which take into consideration the long-term nature of the pension plan:

- rate used to discount future investment income – 9.25%, and future pension benefits – 9.25%;
- salary escalation rate – 7.75%;
- rate used to estimate ad hoc improvements in pension benefits to partially offset the effect of increase in cost of living – 2.88%;
- average retirement age for males – 58.8 and for females – 59.8; and
- average remaining period of service of the employees – 16 years.

Based on this valuation, the actuarial present value of the accrued pension benefits is estimated to be $2,749 million as at December 31, 1987, and the pension plan assets available for these benefits were $3,151 million.

The pension costs for 1987 were $13 million based on the most recent actuarial valuation for accounting purposes (1986 – nil, based on the actuarial valuation for funding purposes as at December 31, 1985). This amount is comprised of Ontario Hydro's current service cost of $60 million, partially offset by the amortization of $47 million of the net surplus. In 1987, approximately $10 million of the pension costs were charged to operations and $3 million were capitalized.

On October 21, 1986, the Ontario Hydro Employees' Union, Local 1000 of the Canadian Union of Public Employees – C.L.C. filed an application for judicial review in the Supreme Court of Ontario to determine whether Ontario Hydro is entitled to apply the pension surplus that has accumulated in Ontario Hydro's pension plan to meet the Corporation's contribution with respect to current service cost. The hearing on this matter was held on February 5, 1987. On March 3, 1987, the Supreme Court rendered its decision that Ontario Hydro has complied with the relevant statutory provisions regarding the corporate contribution towards current service cost. The Ontario Hydro Employees' Union has appealed the court's decision.

Group Life Insurance Plan:

The group life insurance plan had assets of $31 million as at December 31, 1987 (December 31, 1986 – $33 million). Effective April 1, 1986, the assets are being used to pay the insurance premiums for all members of the plan until such time as the assets are fully utilized.

15. Research and development

In 1987 approximately $74 million of research and development costs were charged to operations and $17 million were capitalized (1986 – $59 million and $20 million, respectively).

16. Comparative figures

Certain of the 1986 comparative figures in the Statement of Cash Used for Investment in Fixed Assets have been reclassified to conform with the 1987 financial statement presentation.

	1987	1986	1985	1984	1983
Revenues			*millions of dollars*		
Primary power and energy					
Municipal utilities	3,441	3,116	2,891	2,555	2,265
Rural retail customers	968	885	815	712	644
Direct industrial customers	675	604	568	516	448
	5,084	4,605	4,274	3,783	3,357
Secondary power and energy	196	248	351	429	448
	5,280	4,853	4,625	4,212	3,805
Costs					
Operation, maintenance and administration	1,150	1,014	966	884	952
Fuel and fuel-related	1,308	1,089	1,143	1,210	1,169
Depreciation	723	705	655	476	396
	3,181	2,808	2,764	2,570	2,517
Income before financing charges	2,099	2,045	1,861	1,642	1,288
Financing charges					
Gross interest	2,744	2,684	2,551	2,322	2,012
Capitalized interest	(978)	(1,038)	(1,166)	(1,293)	(1,194)
Investment income	(64)	(61)	(60)	(80)	(58)
Foreign exchange	126	213	176	118	56
	1,828	1,798	1,501	1,067	816
Net income	271	247	360	575	472
Financial position			*millions of dollars*		
Total assets	32,657	31,357	29,320	27,301	23,194
Fixed assets	27,986	26,103	24,149	22,147	19,948
Long-term debt	23,862	23,494	22,518	20,659	17,977
Equity	4,962	4,691	4,444	4,084	3,509
Cash flows			*millions of dollars*		
Cash provided from operations	1,204	1,040	1,055	1,088	950
Cash provided from financing	1,330	1,960	757	1,756	1,823
Cash used for investment in fixed assets	2,452	2,585	2,644	2,539	2,668
Investment in fixed assets	2,524	2,523	2,541	2,624	2,746
Financial indicators					
Debt ratio[1]	.836	.835	.830	.833	.840
Cash flow coverage[2]	1.08	1.05	1.02	.96	.88
Interest coverage[3]	1.10	1.09	1.14	1.25	1.24
Primary energy sales[4]			*millions of kilowatt-hours*		
Municipal utilities	84,058	80,026	77,011	74,283	70,579
Rural retail customers	16,599	16,279	15,638	14,732	14,006
Direct industrial customers	19,561	18,458	18,011	17,816	16,345
	120,218	114,763	110,660	106,831	100,930
Secondary energy sales[4]	6,515	6,046	8,565	10,627	11,900
Installed dependable peak capacity (megawatts)[5]	30,080	30,701	28,224	26,612	25,269
December primary peak demand (megawatts)	20,524	20,609	20,473	18,052	18,792
Primary energy made available (millions of kilowatt-hours)[6]	126,455	120,574	116,049	112,293	106,071

	1987	1986	1985	1984	1983
Number of primary customers[4]					
Municipal utilities	316	316	316	319	320
Rural retail customers	835,925	813,193	795,022	779,748	768,504
Direct industrial customers	108	106	103	105	108
Average revenue[4]		*in cents per kilowatt-hour of total energy sales*			
Primary power and energy					
Municipal utilities	4.094	3.894	3.754	3.440	3.210
Rural retail customers	6.342	5.901	5.720	5.143	5.027
Direct industrial customers	3.451	3.272	3.155	2.896	2.740
Secondary power and energy	3.008	4.102	4.098	4.037	3.768
All classifications combined	4.211	4.060	3.925	3.586	3.409
Average rate increases		*expressed as a per cent*			
Municipal utilities	5.2	4.0	8.5	8.0	8.2
Rural retail customers	6.6	3.8	8.7	7.5	8.8
Direct industrial customers	5.6	4.3	8.8	7.6	8.5
All primary customers combined	5.5	4.0	8.6	7.8	8.4
Average cost[4][7]		*in cents per kilowatt-hour of energy generated*			
Hydraulic					
Operation, maintenance and administration	.276	.213	.187	.184	.159
Fuel-water rentals	.285	.243	.233	.164	.076
Depreciation and financing charges	.465	.413	.399	.384	.345
	1.026	.869	.819	.732	.580
Nuclear					
Operation, maintenance and administration	.508	.481	.479	.506	.491
Fuel-uranium	.482	.481	.426	.361	.357
Depreciation and financing charges	2.201	2.073	1.889	1.330	1.026
	3.191	3.035	2.794	2.197	1.874
Fossil					
Operation, maintenance and administration	.487	.550	.437	.348	.368
Fuel-coal, gas and oil	2.598	2.746	2.609	2.500	2.417
Depreciation and financing charges	.905	1.367	.997	.597	.586
	3.990	4.663	4.043	3.445	3.371
Average number of employees					
Regular	24,066	23,373	23,001	23,150	24,320
Non-regular[8]	8,081	9,032	8,135	6,463	6,913

Footnotes

(1) Debt ratio represents debt (bonds and notes payable, short-term notes payable, other long-term debt, and accrued fixed asset removal and irradiated fuel disposal costs less unamortized foreign exchange gains and losses) divided by debt plus equity.

(2) Cash flow coverage ratio represents funds provided from operations plus net interest, and interest charged to fuel for electric generation less interest on accrued provisions divided by interest on bonds, notes, and other debt.

(3) Interest coverage represents net income plus interest on bonds, notes, and other debt divided by interest on bonds, notes, and other debt.

(4) Figures for 1987 are preliminary.

(5) Installed dependable peak capacity represents the net output power supplied by all generating units, and includes non-operating reserve facilities: 1987-2,667 megawatts; 1986-3,784 megawatts; 1985-3,933 megawatts; 1984-3,999 megawatts; and 1983-3,783 megawatts. Also included are net firm power purchase contracts.

(6) Primary energy made available represents primary energy sales plus transmission losses and energy used for heavy water production and generation projects.

(7) Average cost per kilowatt-hour represents the costs attributable to generation but excludes the costs related to transmission, distribution and corporate administrative activities. These figures reflect the historical accounting costs of operating facilities and the actual energy generated by these facilities during the year.

(8) The majority of non-regular staff are construction tradespersons.

FIVE-YEAR SUMMARY OF STATISTICS - CUSTOMERS SERVED BY ONTARIO HYDRO AND ASSOCIATED MUNICIPAL UTILITIES

	1987	1986	1985	1984	1983
Total number of customers[1]			*in thousands*		
Residential	2,860	2,781	2,712	2,652	2,604
Farm	106	106	107	107	108
Commercial and industrial	378	365	354	346	339
	3,344	3,252	3,173	3,105	3,051
Average annual use[1]			*in kilowatt-hours per customer*		
Residential	10,960	10,909	10,618	10,590	10,149
Farm	23,540	23,004	22,618	22,556	21,389
Commercial and industrial	218,800	216,666	213,673	212,700	200,436
Average revenue[1]			*in cents per kilowatt-hour*		
Residential	5.96	5.63	5.42	5.02	4.69
Farm	6.47	6.00	5.74	5.24	4.87
Commercial and industrial	4.42	4.20	4.03	3.74	3.50

Footnote (1) Figures for 1987 are preliminary.